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THE FEEDING OF SEAMEN AND MARINES ON BOARD H.M. SHIPS AND THOSE IN THE NAVY OF THE UNITED STATES.

By a Naval Officer.

THERE has been much attention drawn of late to all connected with the Royal Navy, as far as the material goes: but, little having been paid to the personal part of the matter, I think it would be well to bring to the front a subject seldom thought of, viz., the feeding of our men on board men-of-war.

To my own knowledge, but trifling alterations have been made for the last forty years; the seaman still has his breakfast of cocoa and biscuit at about 7 o'clock A.M.; at 12 o'clock, his dinner, consisting of (in harbour) a pound of fresh beef, vegetable soup, biscuit, and a wine-glass of rum with twice the amount of water; lastly, at 4.30 P.M., his supper, as it is called, viz., a basin of tea and biscuit; nothing more and nothing less. In harbour, the biscuit (a pound *per diem*) is frequently changed for bread; at sea, salt beef and salt pork are substituted on alternate days for the fresh beef. With the salt beef, materials for suet puddings with raisins are issued; on pork days, pea soup is added, a piece or two of the ration of pork giving it an excellent flavour. Oatmeal for thickening the vegetable soup is allowed, and seasoning material, such as mustard and pepper. Should the ship remain at sea any number of days—fourteen, I think—lime juice is obliged to be taken by the men, preserved beef and vegetables being occasionally substituted for the salt beef and pork. Steam having taken the place of sails to a great extent, long voyages are the exception—I mean those of a month or six weeks—thus lime juice, except on foreign stations, is but little required.

Taking into consideration the ordinary food supplied to our seamen, I cannot help thinking that there should be a greater variety, and a better distribution as to the times of partaking of the various meals. For a healthy man beginning a day, a basin of cocoa and a third of a pound of biscuit broken into it is a fair meal, and that is all. His next meal at 12 is an excellent one, as, though he always has in harbour fresh beef, he varies it by making pies, puddings, Irish stews or frying it; but then after that, he has nothing until 7 A.M. next

morning, except a basin of tea and sugar without milk and with the remnant of his biscuit. Surely the intervals between meals might be better arranged, and some variety of meat provided, though I am quite aware the British bluejacket loves his beef, and would not change it for an equal amount of mutton, as his idea is, there is more nourishment in beef than in mutton, and the latter being cheaper, Government would gain by the transaction. There is also an answer to this, why things should remain pretty well as they are, and that is, "Look at our seamen and marines. Can you have a healthier body of men? What more do you want?" Very true; but how does it come about? Not from the Government allowance of food, but from the care taken by the Officers to have in each ship a good canteen well supplied, as well as the system now prevalent of allowing men to fall out before the morning drills begin at 9.30 A.M., and have a hot basin of coffee for a halfpenny and something to eat. Thirty years ago at sea most men used to chew tobacco to stave off the pangs of hunger when alcohol could not be had and the bumboat was not handy. Nowadays, tobacco chewing is almost unknown, and hard drinking on the wane, as the canteen supplies the more healthy stimulant of a change, as well as extra diet. The canteen, it must be remembered, unlike that in the Army, is unrecognized by the Admiralty; it is permitted, and that is all. A Captain may consider it all nonsense. He may say, "It was never done when he first went to sea; why should it be necessary now? The ship is too crowded; no room; the men must do without, and a bumboat does well enough in harbour." Aye, the bumboat, with its stale tarts, cooked fish, Bologna sausage, fruit, clay pipes, and plugs of tobacco, all more or less mixed together, with a dash of salt water that has splashed over the side of the boat to flavour it. No; the time has arrived when the canteen, good food, and air should be considered as essential to the well-being of a ship and her crew as any of the complex machines that go to make that wonderful thing, the modern man-of-war. A sound mind in a sound body is as necessary as any of the new and expensive weapons, for without it the latter are naught. Nothing so essential as this should be left to the caprice of a Commanding Officer. A space should be told off and fitted up for a canteen; supplies for it in the shape of bacon, sardines, cheese, jams, pickles, &c., available at all coaling stations supplied at cost price *plus* expenses. At present the Officers have to stand the risk of any loss in canteen accounts, and very often put their hands in their pockets to start it. Is this just or right? But it is invariably done, and why? Both Captains and Officers know that making the men more contented and cheerful assists discipline. The drills are better and more smartly done, and as every ship vies with its neighbour in every way, both as to smartness in drills, behaviour of their men, and the credit to be obtained of having a happy ship as well as a smart one, interest is taken in the canteen, and it is done, and well done, but could be better done, because cheaper, if the Admiralty would supply the things at no loss to themselves and with a saving to the crew. Looked at by Government from a selfish point of view, it would pay; the money

received by the men, instead of being hoarded and spent in a couple of days in dissipation when the ship arrives in harbour, would be spent gradually in canteen goods, and benefit the Service by checking ill-living and making the crew a healthier and sturdier race. This it does now, but to a limited extent only, as the goods are bought from retail shops, and the money does not go so far.

The Army are taking up just now with increased interest the feeding of their men. An able lecture given by Lieutenant and Quartermaster Thorpe on Army Cooking and Messing, at the Royal United Service Institution, January 30, 1891,[1] shows what can be done with small means; to hear how the Royal Irish Rifles are fed would make our men's mouths water. There the War Office ask the Officers to take an interest in the feeding of the men. In the Navy it is the Officers who strive to show the Admiralty what ought, can be, and is being done. Will not the Admiralty help the Officers, and appoint a Committee to see, and inquire, and suggest?

I have before me now the Ration Regulations of the United States Navy for comparison; they are perhaps more like the wants of British seamen than that of any other nation. These Ration Lists were made out in 1884, and one paragraph I must quote:—

"Commanding Officers will be governed to the fullest extent practicable by the following recommendations of a Board appointed by the Department to report on the subject of the Navy ration, viz.:—

"'A very important point is a better distribution of meals over the working hours of the day, and we therefore recommend that the attention of Commanding Officers be called to the matter, and that in the future the breakfast hour may be earlier, and the supper hour later, than has been the custom of the Service, and also that they should give such directions as will ensure the setting apart of a suitable portion of the ration, to the end that a substantial breakfast may be duly provided, and, if possible, a small amount to the men going upon the mid watch at sea.'"

They evidently found out in 1884 that meal times which used to be as ours were then, and are now, were not all that could be desired. The variety of their rations is very great, too much so in my opinion, but then they do it in place of having a canteen. They have no depôts, but buy all they want in the open market. They allow seven kinds of preserved meat, any of which can be served out when procurable, an equal number of dried fruits, also tea, coffee, cocoa, butter, pickles, molasses, &c. They allow $1\frac{1}{4}$ lb. of fresh meat to our 1 lb., and a weekly allowance of $\frac{1}{2}$ pint pickle, $\frac{1}{2}$ pint molasses, and $\frac{1}{2}$ pint vinegar. Vinegar alone of the three last do our men get. Still, as I said before, I should prefer our dietary and the canteen, with a change in the hours of feeding and an addition to the supper meal. The extra fat and dripping or its equivalent in money, which goes (from Lieutenant Thorpe's paper) to buy extras for soldiers, in the Navy is returned to the dockyard. Why is this? Could it not help the evening meal? I think so, if to it were added the money saved from the men's rations who go on short leave.

[1] See "Journal," No. 157, p. 239, *et seq.*

ON THE ENTRY AND TRAINING OF THE NAVAL EXECUTIVE.

By Lieut.-Commander Scott W. H. Gray, R.N.

In a discussion lately with some brother Officers, on the entry and training of the executive branch of the Naval Service, it was unanimously agreed that the age of entry ought to be increased; but it was questioned, if this were done, whether a sufficient number of desirable candidates would be forthcoming. In support of this view, it was urged that at the age of fifteen or sixteen a youth would weigh the pros and cons more carefully, and would not be carried away by enthusiasm for a Service of which he had heard so much, or the glamour thrown over a naval life by reading history and the novels of Marryat, Chamier, and others. There are few boys that have not had at one time in their lives the desire "to go to sea," but it was contended that this has generally passed off by the age of sixteen, and that he would then refuse to put up with the discomforts of a chest and hammock, or even the confined space of a ship's cabin. In addition, he would study the question of pay and the small chances of advancement, and would turn his attention to more money-making professions. Personally I do not agree with this idea, but am firmly of opinion that it would not be the case, and that the Service would still be sufficiently attractive to draw the best blood and ability of the country into its ranks, *with their eyes open.*

Though not a money-making business, or one giving a life of comfort and ease, it is a profession of and for gentlemen, one giving position and distinction to every one who serves in it, and one in which ambition has free scope. The Admiral's flag may reasonably be among the hopes of all, and the possibility of many. In addition to this, when "What to do with our sons" is one of the questions of the day, parents will add their influence to induce their sons to take up such a profession, one with which in many cases they or their families have been intimately connected for generations.

My idea is that the age of entry should be not earlier than fifteen, and not later than sixteen. I consider that from twelve to sixteen are the best years of a boy's school work. It is at this time that he begins to get a good grasp and the mastery of the subjects he has been studying, and to realize the power and advantage of a good education. In this way he would have a sound groundwork on joining the Service, instead of leaving school just at the critical time and plunging into an almost entirely new set of studies before he knows the old, as he does under the present system. On entry, he should join an Admiralty Training College on shore, such as has been

proposed to take the place of the "Britannia." He should remain there for two years, during which he should *complete* his mathematical studies, and be grounded in the technical subjects, such as navigation, nautical astronomy, &c., that he will have to practise at sea. He should go through a course of seamanship as now taught in the "Britannia" (revised according to the present requirements of the Service), and also a light elementary course of gunnery and torpedo might be advisable, but nothing that would not be thoroughly practical and that he would have to unlearn again. This would prevent his coming to sea entirely ignorant on such matters, or appearing so on shore at an age when he might be expected to know something professional, and would form a basis for subsequent studies; but it should all be considered as subsidiary to his school work. Then at the end of two years (when he passes out), having finished with x and y, when he goes to sea, he can devote the whole of his attention and energies to the study of the practical part of his profession, a little further instruction in gunnery and torpedo, and a course of training in steam; but the greater part of his time should be employed in learning what generally comes under the head of seamanship, taken in its broad sense, and navigation. Instruction in this latter should be given by the Navigating Officer of the ship.

It may be said that the age of seventeen or eighteen is too old to learn seamanship, but I do not think so. I have frequently heard it said by Officers that they picked up all their knowledge of seamanship in the last year or two of their Midshipman's time, when they reasoned out the why and wherefore of things, and understood what was being done.

Under the present system, the number of things a boy is trying to learn at one time is greatly multiplied, and under very varying circumstances. It is very unfair to expect similar results from all, even supposing that their abilities and application were equal. Setting aside the important consideration of the difference in naval instructors, the station on which a boy is serving must be taken into account. On the East Indian station, for instance, a ship is seldom out of hot weather. Owing to the necesary routine of the Service, and their other instructions, Midshipmen have to do their school work in the afternoon on certain days of the week, instead of in the forenoon. This is the case on all stations; but is it likely a boy can derive the same benefit from a couple of hours' study under the languid and drowsy feelings engendered by such heat, as his contemporary in the Channel Fleet, who is in a more comfortable temperature, and who gets a certain number of months in cool weather every year?

There is yet another and very serious drawback to the present system outside the school question. Do what you will, make whatever restrictions and regulations you can, you cannot prevent youngsters from being a prey to temptations in foreign towns, that the schoolboy of the same age at home is free from. I do not know if it does them any harm "to see life" so young, but it cannot do them any good, and they are more likely to resist such temptations when a couple of years older, and their characters are more formed.

The present system in vogue in the "Britannia" of granting sea time on passing out should be continued in the proposed training college, as it not only gives an incentive to work, but also gives the more able and well-behaved Cadet a chance to draw ahead of his classmates. By this arrangement, as heretofore, some few would go to sea as Midshipmen, but the majority would have to serve a period varying from one to twelve months as sea-going Cadets.

He should have to serve as a Midshipman for two years before he can present himself for examination in seamanship. This seems a short time, but he probably has a period of Cadet's time in addition, and it ought to be enough, as seamanship has been his chief study during that time. If abroad the examination should be a provisional one only, and no class given. The difference in the present Examining Boards is well known, and has long been cried out against. A permanent Board at home would avoid any chance of injustice on this score, and its members would be able to judge the comparative merits of the candidates, so as to award them classes more according to their deserts. After passing in seamanship, he should have a thoroughly good course in gunnery, torpedo, and pilotage, with an examination and class certificate in each. As he has only lightly touched on these subjects before, if necessary, the present courses might be lengthened, but all three should not take longer than six months. Then the only further education he should require is experience.

Including any time served at sea as Sub-Lieutenant between his provisional and final seamanship examination, he should then complete a year at sea before he can be promoted to Lieutenant, thus being at least 18 months seniority. Promotion should then be given by a sliding scale according to his certificates, as has lately been approved by the Admiralty.

In this way all Officers would have had the same chances. In school work they would have all been instructed under the same staff, instead of its being, as at present, a piece of luck whether a Midshipman gets under a naval instructor who is able to impart knowledge or the reverse, and they would pass before the same Examining Board in seamanship.

Naval Instructors would not be required, except in the colleges, and in this way a large item in "pay" would be saved to the Admiralty. This could go wholly or in part towards making the Training College one of the best schools in the country. It would also do away with a cabin in many sea-going ships, no small consideration in the present day, when every inch of available space is so valuable.

Greenwich College should be retained on its present lines (without the Sub-Lieutenants) as a kind of Staff College, *i.e.*, for Gunnery and Torpedo Lieutenants, other Lieutenants the Admiralty may select, or allow to take up higher mathematics, and for voluntary courses on half pay.

In the system proposed, the minimum age of promotion to Lieutenant would be, supposing entry to have been at 15, Training College left with full sea time at 17, first class certificates in all subjects

after two years as Midshipman, giving only 18 months as Sub-Lieutenant, 20½ years. This is possible but not probable, so it may be put down as 21. The maximum, except in cases of failure to pass and consequent loss of time, would be 22½ + the maximum time for Sub-Lieutenant with all third class certificates—say two more years —or 24½, and we may, therefore, take the average as between 22½ and 23 years.

This does not seem to me too old. It may be a slight advance on the present average, but in the years from 1873 to 1876, when the majority of Sub-Lieutenants were about 5 years in that rank, the average must have been somewhat similar.

This need not necessarily increase the age of promotion to Commander, as it will be much the same as matters stand at present.

Admiral Colomb recently pointed out that it was not economical to retain Lieutenants until they reached the maximum age for retirement, and then give them a considerable pension to go, that the freeing of the Lieutenants' list must come from below, and that instead of retaining a man against his will, he should be allowed to go when he wishes. Then those that see further advancement impossible would accept very much smaller pensions, and go when still young enough to turn their attention to other professions. In connection with this, it might be worth while to consider the question of a bonus at the end of certain periods (like the doctors) instead of a pension at all. The objection to this is a recurrence of the trouble that is said to have occurred when commuting was first allowed, and numbers of Officers, having lost their all from want of business training, returned to the Admiralty, asking for help. But with a better school education, as has been suggested, and being allowed to go young—before becoming fossilized and groovy—would this be the case? It might be with some, but I venture to think it would not be with many. Or they could be given a small retaining fee in addition, and put on a Reserve List to be called on in case of war.

I have apparently got outside my subject, but it all bears on the entry of candidates. If a youth knows that he will not be retained against his will, should he find himself unsuited to the Service and other more genial work open to him, one of the deterrent conditions urged against the supply of candidates is removed. His parents will have borne the expense of his education up to the time of his leaving the Training College, and the country will have received work done in exchange for the pay he has had as Midshipman, Sub-Lieutenant, and Lieutenant. Concerning pay, I think a Midshipman's ought to be 3*s.* 6*d.* per day. This for two years would amount to no more than the 1*s.* 9*d.* per diem for four years of the present system. Though learning his profession, he is doing duty and work, and should not at that age be entirely a burden on his family. Sub-Lieutenants should receive the same as their opposite members in the sister Service—7*s.* 6*d.* per diem—so that it is possible for them to live on their pay.

As it is now, parents have to pay for them while in the "Britannia," make an allowance of 50*l* until Sub-Lieutenants; and almost invari-

ably have to help them very substantially until promoted to Lieutenant.

In conclusion, I might briefly sum up my ideas into: "Later entry and, consequently, better school education to start with, and in all subsequent studies one class of subjects should be paramount at a time—mathematics, seamanship, gunnery, torpedo, and pilotage each in its turn—and not all together as is now attempted."

P.S.—When this was written, I had only seen a short account of Admiral Colomb's lecture, in a newspaper. I have just received the R.U.S.I. Journal for August, but, being just off for Bombay, have no chance of re-writing the part referred to in this.

THAT THE RE-ESTABLISHMENT OF A SEPARATE NAVIGATING LINE IN THE NAVY IS UNNECESSARY.

By Captain WILLIAM WILSON, R.N.

CAPTAIN FITZGERALD, in his paper on "The Re-establishment of a Separate Navigating Line in the Navy,"[1] has certainly given us all the reasons that can be adduced for what would, undoubtedly, be a retrograde step.

He gives us five arguments that were used at the time the change was made, and the work of the Master was turned over to the Lieutenant for navigating duties.

He criticizes these arguments, and propounds the following question:—

"Is the navigation and pilotage of Her Majesty's ships a matter of sufficient importance to justify the maintenance of a separate navigating branch, if experience teaches us that the highest practical skill in this art is unattainable without the special devotion of an ordinary man's talents to the study of the theory and practice of it?"

He does not consider the re-introduction of the Masters' line practicable, but he insists very strongly on the necessity of specialists for navigation, and, with this end in view, submits a solution of the difficulty.

I propose to offer a few remarks on the five arguments quoted by him, so far as they are of importance at the present time, to endeavour to show that his proposal would not attract the best of the young men, only those among the seniors who were failures, and those too late in life for them to succeed as navigators; and that the present system will, if the Lieutenants employed for navigating duties get their fair share of promotion, give us just the specialists he so strongly insists on.

Argument No. 1. "That every executive Officer should be able to navigate a ship."

It is difficult to say whether the watch-keeping Lieutenants of to-day know more navigation than those of the past; my opinion is that they do; it is, and must always remain, a matter of opinion. There are, however, many Officers who, as Sub-Lieutenants or Junior Lieutenants, have been employed for navigating duties, have taken up torpedo, gunnery, or the First Lieutenants' line, or, for other reasons, have dropped them. Surely the experience they have gained as navigators is by no means thrown away? They are available if the navigator is sick, or for consultation when a knotty point has to be

[1] The "Journal of the Royal United Service Institution," October, 1891.

decided, and they certainly make no worse gunnery or torpedo Officers now, or Captains in the future, for having done some navigating in the past.

Argument No. 2, "That the French have no navigators, and get on without them," does not seem to me to affect the matter one way or the other. No one will, I fancy, be bold enough to say that the French ships are now, or ever have been, better handled than our own; and it is not a question of merely "getting on."

Arguments Nos. 3 and 4, "That the position of the Masters was invidious," "that they could never become Admirals," and the "social question," do not, the Masters being abolished never to return, affect the present situation.

Neither is Argument No. 5, "That the Masters knew no gunnery," of vital importance. If it had been considered wise to retain the Masters, they could, as Captain FitzGerald says, have been taught gunnery without much difficulty.

Captain FitzGerald, in criticizing these five arguments, tells us a good deal about "Jacks of all trades," and "specialists;" he brings up the old story that a baker cannot be expected to be a butcher, or a tailor a shoemaker, which is in no way on all fours with the requirements of the Navy.

It is from the Lieutenants' list that we must eventually get our Captains, and especially from the specialists among the Lieutenants, that they come; if, as Captains, they are to be efficient, they must keep up their general knowledge of naval matters as well as their special knowledge of their own particular line while Lieutenants; and I see no sort of reason why they should not do so; why the torpedo and gunnery Lieutenants should not have a good general knowledge of practical navigation; in fact, with the torpedo men it is a necessity, or how are the torpedo-boats to be kept afloat? or why the navigator should not have a good practical knowledge of gunnery and torpedoes, of naval discipline, and the interior economy of a ship-of-war; his time and talents are not so taken up with his own specialism when the ship is in harbour, as she must be for a large proportion of the year, that he cannot keep himself abreast of the times in these and other matters of general importance.

The question, "Is the navigation and pilotage of Her Majesty's ships a matter of sufficient importance to justify the maintenance of a separate navigating branch, if experience teaches us that the highest practical skill in this art is unattainable without the special devotion of an ordinary man's talents to the study of the theory and practice of it?" must, undoubtedly, be answered more or less in the affirmative, that is to say, that it is of vital importance that the navigation and pilotage of our ships should be in the hands of the very best men that can be found for the work, and that, having found the best men, every inducement must be given them to continue their navigating duties as long as possible; and I maintain that our present system, if properly carried out, will give us the best men for the job, and will in the future keep them till they have given the Service the best work they are capable of as navigators.

But before considering this part of the question let us turn to Captain FitzGerald's solution of it.

He proposes "to continue to enter all alike as Naval Cadets, to the exclusion of the poor man's son, and then to make it worth the while (with money) of a certain number of Lieutenants to take up the navigating line and to stick to it for the remainder of their careers, giving up their chances of becoming Captains and Admirals."

He wishes to "endeavour to attract into the navigating line the Lieutenants who at ten or twelve years' standing and thirty-six years of age are still keeping watch." He says, "they should be induced to make it the business of their lives, to take it up at any time, either as Sub-Lieutenants or Lieutenants."

Now what Sub-Lieutenant or young Lieutenant will believe that he will be watch-keeping at the age of thirty-six? If he is any good at all he is cock-sure he will be a Commander by that time, and probably thinks he has a good chance of being a Captain; when he has been ten years a Lieutenant, if not clever enough to have gone in for gunnery or torpedo, or smart enough for any Captain to take him as First Lieutenant, in short, if an unsuccessful man, he may see things from a different point of view, and be glad enough to take refuge in the navigating ranks.

But are our lamented, trustworthy old Masters to be replaced by unsuccessful Lieutenants, and are they to take up their navigating duties after they are thirty? Hardly, if our ships are to be handled as they have been heretofore!

It is true that many men in the old days did not become Masters till they were thirty, but as Second Masters they had been navigators of gunboats, or had assisted the Master of a big ship, and taken his place when the necessity arose, thus gaining much experience these elderly Lieutenants would be without.

Of course some young men would be caught by the bait, but they would not be the best, but the impecunious or those who wished for easy billets, for a navigator with no other duty in these days of fast steam passages, would often have a very easy billet indeed. And why should a young man, with perhaps a father at his back and an allowance, give up his chance, or what he probably considers his certainty, of promotion, with its accompanying increase of pay, for an increase without the promotion?

Let us now apply Captain FitzGerald's solution to the gunnery men; does he or any one else believe that, however large pay were offered to Lieutenants without prospect of promotion to take up gunnery duties, the result would be satisfactory; that the clever, smart, young men who have received early promotion for examinations, and who now come forward for gunnery, would have anything to do with it; or that the energy and talent which has brought naval gunnery to the high pitch of perfection it now enjoys would have ever been turned to that science by large pay alone?

And yet it is quite as important that the best men should be drawn to the navigating line as it is that they should to the gunnery department.

It is the chance of early promotion from the Staff appointments that has made so many of our best men gunnery Lieutenants, and it will be by giving promotion only, that the best men will be persuaded to take up navigation, and not by taking it away and offering money in its place.

There is underlying this matter a great truth to which Captain FitzGerald does not allude, "That a really good navigator is born and not made," that is to say, that certain qualities are necessary for success in this line, that are by no means to be found in every Officer who joins the Navy. Strong nerve, a capability for taking endless trouble, powers of observation, and decision of character are some of them; and whether a man possess these qualities can only be ascertained by practical experience at sea. One man takes a pride and a pleasure in making his port under adverse circumstances without more delay than is reasonable, while another is miserable and fidgety when it is too thick to make the lights at their usual distance, merely from want of nerve and lack of confidence in himself. If you have a good supply of the first sort, you may with advantage allow the second to turn their attention to some other work, and give up the navigating. But this was just what with the Masters you could not do; once started in the Masters' line a man had no option, he must go on navigating, however constitutionally unfitted for the work, or leave the Service.

Of course we know that the majority of the Masters were extremely good men, but in the nature of things there must have been a minority who were not good, and never could become good, navigators; and yet, till the inevitable catastrophe came, there was no choice but to give the navigation of Her Majesty's ships to their care, even in cases where their inefficiency must have been known, though by some good luck they had never committed themselves.

This is not so now; a Lieutenant (*N*) who does not show any aptitude for his duties, can, either at his own request, or by the representation of his Captain, be simply not appointed for navigating again; he may take up gunnery or torpedo—his having failed as one sort of specialist is no reason he should not succeed in another line—or he may become a hewer of wood and drawer of water and end his days in the Coastguard, and it is much better for every one concerned that he should end even thus, than by losing a ship, and perhaps many valuable lives.

It must not be forgotten that the art of navigation has been much altered, and in some ways simplified, by the introduction of powerful steamers. Passages are now made at a high speed, which tends to minimize errors due to tides and currents; they are also made in much less time than formerly, so that the opportunities of rating chronometers are more frequent; the dangers of a lee shore practically do not now exist, and if a ship gets into a tight place she may very well, with the help of her engines, get out of it again.

A sailing vessel after a two or three days' gale was often many miles out of her reckoning, and nothing but long experience in many gales availed to estimate this error with anything approaching accu-

racy; now it is only very heavy and exceptional weather that will prevent our fast cruisers and first-class ironclads from making good way on their course, and the mere navigation of a ship from one port to another is consequently simplified, and may well be done satisfactorily by an Officer of less experience than was once necessary. On the other hand, the high speed at which ships travel, especially if they happen to be in a hurry, calls for unceasing and untiring vigilance and nerve on the part of the navigator of to-day; there is often no time now for consideration or consultation, the decision must be made at the moment, or disaster follows; and this will especially apply to any naval action that may be fought in the future, when a mistake may well lead to your giving a friend the benefit of your ram instead of an enemy. In the sailing days, if one liner fouled another no great harm was done; a few spars came down by the run and were smartly shifted, a boat or two was, perhaps, totally disabled, one ship lost her figure-head and the other part of her bulwarks; but nothing was likely to happen that would send either into harbour, or prevent them going into action. Now, one touch of the tremendous forging our ships carry at their bows, if it does not send a friend to the bottom outright, will certainly necessitate his making a long stay in a dockyard. This seems to point to the conclusion that the quality of nerve is even more necessary in the navigator of to-day than it was in the Master of the past.

Now it is, I believe, generally admitted that an ordinary man's nerve is not likely to improve after a certain age; the age will vary with the man, and with the life he has led, but I should say that on the average a man's nerve will begin to decline between the ages of forty-five and fifty. I do not of course mean to say that there are not many men whose nerve is not undeniable long after fifty; but I do say, that most men after a long harassing night on deck in the wet and cold, when coming up Channel in thick weather, will not be quite so ready to go fast through a narrow passage they are not well acquainted with at the age of sixty as they would have been at the age of forty; and I am inclined to think that we should not endeavour to make our navigators serve after the age of fifty if it can be avoided.

I have no wish to deny that in theory every Lieutenant is liable to be called upon to do navigating work, but I do deny that practically the theory is carried into effect, except in cases of Sub-Lieutenants and Junior Lieutenants, or that Officers take up navigating in a haphazard way among a variety of other jobs. One Sub-Lieutenant's capacities for navigating are likely to be pretty much the same as another's; we have the Hydrographer's word for it that these young Officers do not come to grief oftener than their seniors;[1] if they do not take to the job, or it to them, they drop out of it; if on the other hand they succeed, they continue to be appointed to one ship after another for navigating duties, and I really cannot see why they should not become quite as efficient as the Masters were before them.

[1] See "Navigation and Pilotage of H.M. Ships," "R.U.S.I. Journal," May, 1891.

All that is required to keep up a constant supply of promising young men is that those now navigating should get the same share of promotion that other specialists do, and that they should also succeed to the appointments, such as Queen's Harbour Masterships and the command of certain yachts, now held by Staff Captains.

At least one Lieutenant of eleven or twelve years' seniority who has served as navigator from the time he left the College should be selected for promotion to Commander in each year,[1] the remainder taking their chance with their fellows. As Commanders, the offer of early employment for navigating duties is not likely to be refused, and those who go on navigating in that rank should receive the same treatment in matters of promotion as men who continue to serve as second in command till they are posted.

The prejudice against the navigator being senior to the executive Officer is fast dying out. This state of things, once thought so deplorable, obtains on board more than thirty of Her Majesty's ships now in commission; if any grave objection to it had transpired, it would hardly be allowed to this extent. For two years under a former Commander-in-Chief in the Mediterranean, the Commander for navigating duties of the flag-ship was the senior of the two. I have yet to learn that it was in any way "inconvenient or detrimental to the interests of the Service."

Let us now take a case, which, if the concessions I have mentioned in the matter of promotion are made, may very well be a true one. Mr. A., Sub-Lieutenant, gets five firsts and is promoted at twenty; he is clever, smart, and hard-working, and determined to rise to the top of the tree, or as near it as his own unaided endeavours will take him; he has observed that several Lieutenants (N) have lately been promoted young, feels that he has more of a turn for navigation than for torpedo or gunnery, and, on application, is appointed navigator of a small craft. He takes this appointment confidently, for he knows that, if on trial the navigation does not suit him, he can give it up, and, by virtue of his good record for examinations, will have no difficulty in getting into either the "Excellent" or "Vernon." He, however, likes the navigating, and after paying off the small craft, goes to a third-class cruiser, after a commission there to a first-class cruiser; he is now beginning to be known as a capable and rising young Officer, the Captain of this cruiser is a man of some influence, and when our friend is nearly nine years' standing gets him appointed to the flag-ship commissioning for Australia or the Cape; there he does as well as he has in his former ships, and at twelve years' seniority and when thirty-two years old he, in consequence of the representations of his Admiral, gets the navigators' promotion to Commander for the year. He has no difficulty in getting employment as navigating Commander of a battle-ship shortly after his promotion, and a second commission, either as navigator, or in command, makes him a Captain at thirty-nine, and, as the lists stand at present, he will in time be a full Admiral.

[1] Surely one vacancy a year is not too much to ask for the navigators.

It is true we lose this Officer's services as a navigator somewhat early in life, just in fact when we should like to keep them, but we must put up with that; it is an exceptional case that will occur seldom, for it is by their seeing that the navigating line may, with good luck and ability, lead to the top of the tree that the best of our young Officers will be induced to join it and make it their speciality, and I hold by that only.

There will, of course, between the case of this most successful Officer and that of the young duffer who cannot do the job, and drops back to watch-keeping, be a number with all sorts and varieties of success and failure.

B. did not get five firsts, was twenty-four when made a Lieutenant, and got the navigator's promotion the year after A. at the age of thirty-six; he will certainly serve every day of his Commander's time as a navigator, as six months one way or the other in his next step may make all the difference in the matter of his flag. As he was navigating a gunboat for three years as a Sub-Lieutenant, we shall have had about nineteen years' work out of him before he is posted.

C. represents the large majority of Lieutenants (N) who get neither five firsts nor special promotion, and do not become Commanders till thirty-nine, or perhaps older. As things are at present, C. will try and get into the Coastguard as soon as he can, but only because there is a customary limit to the age at which Captains are made, which precludes his hoping for that step.

Now I advocate that age being advanced in the case of navigating Commanders. Why should not C. serve till he is forty-seven or forty-*eight and then be made a Captain and appointed* Queen's Harbour-Master? He will be very glad to do so if he has the chance, and as he will have given the country the benefit of some twenty-eight years' service as a navigator, he will deserve the step, and the appointment. In this case as in others, for one that gets the reward, several will serve without getting it, and not only *shall we keep our experienced men* serving as navigators, but by the length of time they serve, they will *reduce the number of men it is necessary to make navigators* in each year, giving us fewer to provide for in the end and a better opportunity for eliminating the unsuitable.

Finally, I trust I have shown that Captain FitzGerald's plan would not attract the best of the young men, but only those who were either impecunious or sought a soft billet; that those of the older men who were caught by it would be, as a rule, the failures, and that they would take to navigating too late in life to make a success of it.

I advocate one Lieutenant (N) being specially promoted in each year; Commanders (N) who navigate in that rank being treated in the matter of promotion on the same lines as men in the same rank who serve as second in command, and the advancement of the customary age limit for making Captains, in the case of those Officers who are qualified to hold Queen's Harbour-Masterships; and I trust I have shown that, if these concessions are made to the navigators, their line will become as popular with the best of our young men as gunnery or torpedo now is, giving us a large choice among those best

suited to the work; and that the majority of them will continue to navigate our ships as long as it is advisable they should do so.

I am not concerned either to defend or criticize the action taken by distinguished Officers in the past in abolishing the Masters. I have already given one good reason for the step, namely, the impossibility of getting rid of the failures, except by retiring them, or turning them out of the Service. It has always seemed to me that the people in an invidious position were the Lieutenants; was it reasonable, when we were straining every nerve and sparing neither money nor trouble to give them the best of educations, that we should keep up a separate branch of Officers to do their work? I am sure many of them felt this, and, as far as I remember, the change was at the time a popular one, at any rate with the younger men among the executives, for this reason.

Now the Masters are fast passing away, it is only natural we should regret them; we never know the worth of a possession till we lose or are losing it; they filled a place in the Service that can never be filled in the same way again. Not only were they often the Captain's confidential advisers, but also the youngsters'; there are few of us who have not to thank a Master for a good turn of some sort; how often has the kindly advice and steady example of the Master helped a young fellow to resist the temptation that would drag him to destruction; indeed most of us know cases where, but for the influence of one of the Masters' line, a whole mess might well have come to utter ruin. By all means let us regret the loss of our old friends; we cannot bring them back, any more than we can bring back the masts, the sails, the wooden ships, and all the beauty, romance, and poetry of the Service of the past; they are fast passing from our sight, and we, the Officers of the transition stage of the Navy, must soon follow, to be succeeded in our turn by another generation, to whom masts, sails, and Masters will be only a tradition. May these coming men have strength and spirit, when the time of trial comes, so to bear themselves that the shades of these old Masters, to whose skill and seamanship so many of the triumphs of our glorious Service in the past were due, may be proud of their successors' gallant deeds.

MAGAZINE RIFLES IN WAR—A MILITARY PROSPECT.

By T. A. Perry Marsh, Surgeon-Captain Army Medical Staff.

The memorable struggle between the Muscovite and Turk in 1877 was the last occasion on which two great European Powers met in conflict. Since that time the army of every Power of importance has been, or is being, rapidly rearmed with a new form of magazine rifle. This weapon differs from all others of which we have had any battle experience, not only in possessing a magazine, enabling a number of shots to be poured in rapidly at a critical moment, but also in the important particular of a greatly reduced barrel calibre. Though the exact amount of reduction in calibre has differed amongst the various nations, yet the main features of a smaller, lighter, and harder bullet have been universally adhered to in the rearmament of all. In our own Army the 0·450-inch calibre of the Martini-Henry has been superseded by the 0·303-inch of the Lee-Metford.

Taking into consideration the great expense incurred by the various countries in providing a new rifle for their huge armies, in which the infantry are numbered by millions, it seems improbable that any further change of arm will take place for a long period.

In all probability, therefore, the next great war will be fought out with the weapons now adopted, and it becomes a matter of special interest and importance to learn what we can concerning the battle effect of a weapon which is destined to play such an important part in the wars of the future.

The following table gives the calibres of the various new rifles adopted by the chief European Powers:—

Country.	Rifle.	Calibre.
Germany	Mauser	0·310″
France	Berthier	0·301
Austria	Männlicher	0·315
Italy	Vetterli	0·409
Turkey	Mauser	0·433
England	Lee-Metford	0·303

The Russians have not yet, I believe, made a final selection; their delay is due to unsettled points regarding minor items of mechanism, chiefly of the magazine. The principle of reduced calibre and lighter ball will be maintained in whatever weapon they finally adopt.

The question then which presents itself is, "What will be the effect in battle of a rifle missile, small, light, hard, and pointed, travelling at a very high rate of velocity, compared with our past experiences of a larger, heavier, and softer ball, propelled with more moderate velocity?"

To answer this question it will be necessary to examine *seriatim* each particular in which the new magazine bullet differs from those of other rifles used in the past decade. It will be sufficient to confine the enquiry to our own Army, and notice those differences in the projectiles of the Snider, the Martini-Henry, and the new Lee-Metford rifle which might be capable of modifying their effect in battle.

The missiles of these three arms differ in respect of length, weight, diameter, composition, and velocity of flight.

The subjoined table shows these particulars as regards each weapon:—

Rifle.	Length.	Weight.	Diameter or calibre.	Composition.	Velocity (muzzle).
		grains			
Snider.....	1·04″	480	0·577″	Pure lead	1,240 ft. per sec.
Martini	1·27	480	0·450	Lead & tin (1:12)	1,315 „
Lee-Metford.	1·25	217	0·303	A core of lead and antimony covered by a thimble composed 80 parts copper to 20 of nickel	1,800 to 2,000 ft. per sec.

Barrel calibre and diameter of corresponding ball may be taken as practically identical, and the two terms used the one to express the other. The difference between them is so fractional that for our purpose it may be disregarded, and a rifle having a calibre of 0·303 may be taken to propel a missile 0·303 of an inch in transverse diameter; or one with a calibre of 0·450 to have a corresponding bullet of 0·450-inch diameter.

A small variation in the length of conical rifle balls is not generally material to the question of the effects that they produce on impact. Unless such bullets are deviated from their course by accidental circumstances, as a ricochet, the line of flight is point first in the direction of the long axis, with a rotation transverse to that axis. Penetration being effected, the length of metal behind to pass along the track, provided the regular line of flight be maintained, does not increase the size of that track. A hole in a plank, made by a bullet striking it, would not be increased in size by passing a leaden bar a foot long through it, provided the diameter of the bar was not greater than that of the ball, and that its passage were effected in the line of its long axis. Variations in lengths of conical balls may therefore be disregarded when considering their relative effects on impact.

Weight of projectiles is the next point of difference. Those of the Martini-Henry and Snider are identical in weight, being each 480 grains (avoirdupois).

The Lee-Metford ball weighs only 217 grains. In other words, one Martini bullet weighs 46 grains more than *two* of the magazine rifle.

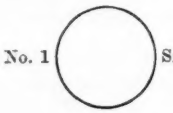
Sir Thomas Longmore, in his work on "Gunshot Wounds," published fifteen years ago, remarks as follows: "The power of destruction of small projectiles is increased according as their weight is increased, form and other things being equal, especially when they are brought into contact with the *hard* structures of the body, is of course an obviously correct principle, but it is questionable whether there can be such difference in weight among the rifle projectiles, which are likely to be issued for military use, as to make the variations of any great practical importance as far as the wounds inflicted by them are concerned." Surely "tempora mutantur." The differences in weight taken cognizance of by Sir Thomas Longmore were those where the variation lay between 400 grains and 600 grains. When the above words were written by the eminent Netley professor, no military authority, however advanced, conceived it possible that in so brief a time the weight of the small-arm projectile throughout Europe was to be reduced by more than one-half; yet such is an accomplished fact. So material a difference can no longer be disregarded, and we have now to consider as a very serious question what modifications in destructive effect will be brought about in battle by the use of so light a bullet.

The object in war, as carried on between civilized nations, is rightly understood to be the placing of antagonists *hors de combat*. It is, theoretically, not necessary to kill. We endeavour merely to disable our enemies individually and collectively; but the disabilities inflicted should, under all circumstances, be at least grave enough to prevent the injured from taking any further part in the campaign; and against cavalry it is desirable that the shock of the wound should be sufficient to immediately stop further progression of horse and rider. All sportsmen experienced in shooting large game understand the necessity of immediately stunning a wild animal. It is no use inflicting a wound which has no immediate stopping power on an animal, though it may subsequently prove mortal. Every tyro in Indian sport knows that to wound a deer, even through the body, with a small ball will, in all probability, only hasten the animal's flight, and preclude the chance of it being added to the bag. A tiger hit in like fashion, though it may be in a mortal spot, will become, *temporarily* at all events, an infinitely greater source of danger to the sportsman than if it were left unwounded. Rash, indeed, is the man who follows up dangerous game unless he be armed with a weapon which is capable by the great shock from its missile of immediately dropping the animal that is being pursued.

It becomes evident from all considerations bearing on the subject that, by the material reduction which has been effected in the weight of our Army rifle bullet, we have sacrificed stopping power to a very

great extent. It may be contended that this is re-supplied by increased velocity. No doubt loss of power on impact caused by loss of weight may, when the missile is used against any solid *resisting* body, be made up again by increased velocity. But rifle bullets in battle are designed for use, not against resisting objects such as iron plates and stone walls, which from their resistance sustain the entire moving energy of the projectile, but against the soft and comparatively non-resisting structures of which the fleshy bodies of men and animals are composed. Against them increased velocity of bullet means (within certain limits) only increased facility for their passing through the tissues. Even with yielding structures, provided the size and volume of missile remain the same, loss of weight can, I admit, be made up for by increased velocity. But in the instance of the magazine rifle bullet, we have a missile which is not only less than half the weight of its lightest predecessor ever used in our Army, but at the same time is little more than half the size. We have, therefore, to deal with not only decreased weight but also decreased size, or, what amounts to the same thing, diminished transverse diameter of the ball.

For purposes of comparison, a representatation of the exact area at the bases and transverse diameters of the Snider (No. 1), the Martini-Henry (No. 2), and the Lee-Metford missiles is given in the accompanying diagrams.



In this way it is brought forcibly home to us how great a sacrifice we have made in size in adopting the magazine rifle. We see that the Lee-Metford ball has a destructive area on impact of very little more than that of the Snider, and its diameter is 0·147 of an inch less than that of the Martini. Such a reduction must necessarily

decrease the size of a wounded area produced by the ball on striking the body. The resisting surface being thus reduced, the ball penetrates and passes through the tissues without having expended much of its energy in their destruction. Its track is so narrow that there is practically no destruction of substance in its wake. Such a ball might pass through a large joint without touching the bones, or between the two bones of the fore-arm or leg without injuring them in the slightest, thus producing nothing more than a simple flesh wound, not grave enough to place the wounded man *hors de combat*, and from which he would, with skilled surgical attendance, probably quite recover in a few weeks. A Martini or Snider ball striking in similar situations would inevitably shock the system and shatter the bones to such an extent as to totally disable the soldier for many months, if not for life. In adopting a lighter and smaller ball we have, therefore, sacrificed to a great extent the stopping power and shock possessed by the larger missiles. Impact shock produced by the magazine bullet is also further mitigated by the fineness or sharpness of this missile's point. It is obvious that for penetrating soft bodies the smaller the point the less is the degree of resisting surface to be overcome by the missile in striking. Penetration is effected by a smaller expenditure of moving energy, and the ball passes completely through structures without having parted with much of its *vis viva*. In other words, the projectile retains its moving power and expends it on further flight, probably to prove only abortive, instead of having first parted with sufficient force to perform its work on the first object struck. Passage through the tissues of the body is further facilitated by the rapid rotatory movement round its long axis which is the property of all moving rifle bullets. The long axis being maintained in the line of flight, it follows that any rotation round that axis must aid in screwing the point onwards and facilitate the penetration of a moderately resisting substance. It is accepted as an axiom in the theory of projectiles that "velocity of rotation increases penetration;" it is, therefore, obvious that a narrow, pointed missile, rapidly rotating, must penetrate the body and pass through the tissues without causing as much damage as a stouter and blunter one. The advantages which might be derived in battle from the increased penetration and accelerated rotation of the 0·303 bullet are much discounted by the diminution of its shocking power, the result of decreased size and sharp point, qualities which doubtless enable the missile to pass through the tissues of the body with less expenditure of energy and consequently with less destruction to the parts traversed. In other words, the great penetrating power of the 0·303 ball is likely, in many instances, to prove an abortive surplus, purchased at the expense of a decreased destructive power. It is true that a ball after having traversed the body of one man has still enough energy left to pass through that of a second or even a third individual, and might possibly do so on exceptional occasions, but that such is likely to happen frequently enough in battle to be counted on as an advantage seems improbable, owing to the open formation of the modern attack. The fact, at any rate, is one of some

importance to those who are concerned with field tactics, and may be suggestive of further changes in this respect.

The next point in the Lee-Metford bullet which is likely to modify wounds produced by it is its composition. The ball (as shown in the diagram) consists of two parts, a core of lead (slightly hardened

by an admixture of antimony), outside of which is a hard, inelastic, coherent, metallic casing or thimble, made up of an alloy of 80 parts of copper to 20 of nickel, having a surface as smooth as polished steel. The effect of this cohesive and inelastic jacket is to entirely prevent any splintering, flattening, or breaking up of the missile on contact. Expansion and splintering are such marked features of the Snider ball (which, be it remembered, is made entirely of soft, pure lead, with a hollow base), that it almost comes within the category of explosive bullets. The ball of the Martini being smaller than that of the Snider, and being composed of lead hardened by an admixture with tin, the breaking up and opening out of the metal on contact is prevented to some extent. With the hard, cohesive Lee-Metford missile splintering may be regarded as practically abolished. It will penetrate and traverse the *soft* tissues of the body as a solid steel missile would do, without becoming flattened or opened out; or indeed suffering any material indentation or alteration in shape. So long as the ball meets with nothing in its course of a hard resisting nature, the wounds will be of a very simple character. Should the missile come into contact with the dense compact tissue of the shaft of a large bone, such as that of the thigh, which has sufficient resistance to cause the ball to expend its full moving energy, it is probable that much damage will be done, and that the resisting bone will be shattered. This does not, however, apply to the more expanded extremities of bones; being made up of soft cancellous tissue, they will be easily perforated, and will not sustain much further injury.

To instance the very hard character of the Lee-Metford ball, I may say that I have one in my possession which, fired at the 800 yards range, ricocheted either from off the top of the target or from the ground near it; having travelled for another mile, it again ricocheted from the surface of some water; it then struck a labouring man and passed completely through the thickest part of his thigh and groin, and finally buried itself in the ground near by. This missile is not

flattened, or in the least altered in shape; its point is not blunted, and practically it bears no sign of having come into contact with anything. It is, therefore, easy to understand how simple will be the character of injuries inflicted by this ball on the body. Even if we leave out of the question for the moment the smallness of size, compared with wounds produced by other bullets, there is the undoubted fact that, on account of the great penetration and perfect cohesive qualities of the ball, wounds produced by magazine rifles will not, under ordinary circumstances, be complicated with the lodgment of the whole or of any portion of the missile; thus, the most troublesome and tedious consequences of gunshot injuries which military surgeons have hitherto had to contend with will be abolished. Some experiments which were made on the bodies of horses when the rifle was first introduced did not, I am aware (especially when bone was struck), result in the production of wounds so simple in character as the ones I have anticipated. It was then thought that the injuries produced by the Lee-Metford ball would indeed be more severe than those of the Snider or Martini. But these trials have become valueless, as they were carried out with an ammunition which was quite different from that now in use. In many of these cases, breaking up or splintering of missile was brought about by the soft leaden core "stripping," or making its way through the hard thimble surrounding it. Such an occurrence was common enough with the imperfect ammunition as first supplied. It is well known to all who nsed the rifle in its early days that this "stripping" in many instances took place even before the missile left the barrel. It was then not at all unusual for the hard thimble to remain impacted in the grooving of the barrel, whilst the core of soft lead passed on to its destination alone. But the missile has now been so altered and improved that it is almost impossible for the core to pass out of its casing, and we may take it as practically certain that there will be no flattening or breaking up on contact, unless the amount of resistance encountered by the ball is sufficient to overcome that of its hard casing, an eventuality which can only happen in the human body when the dense portions of the compact tissue of the largest of the long bones are struck.

The various properties of the Lee-Metford missile which are likely to influence the character of wounds produced by this projectile have now been severally examined, as also the points of difference between it and the missiles of the Snider and the Martini rifles. To shortly recapitulate: a rifle missile has been adopted which is lighter, smaller, harder, more pointed, more cohesive, and which travels at a greater velocity, than any other bullet previously used. From these changes it seems certain that the following modified effects are likely to accrue:—

1. Diminished shock and stopping power on the individual wounded.

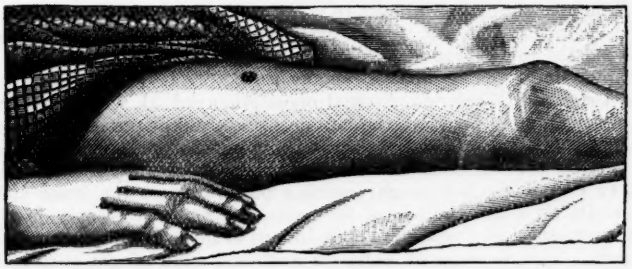
2. Wounds clean cut, much decreased in size, and with very little destruction of the parts traversed by the ball.

3. Wounds uncomplicated by the lodgment of the ball, or by splinters of lead, or any foreign body.

4. Union of wounds by the "first intention," and rapid recovery of the injured.

That the effects of small arm projectiles now adopted by the Great Powers will be of the modified nature before indicated are fair conclusions, drawn from a comparison of their destructive powers with those of the older weapons. But did these conclusions rest on inference only, however logical they might appear, it could yet be said that they remain in the limbo of doubt, requiring the confirmation of actual proof before they can become accepted facts. It is true there has not been any extended experience of wounds inflicted by these rifles. Nothing less than the actual test of war will enable us to accurately gauge their power under all circumstances. Yet we are not totally without experience of what the weapons will do; a few cases have occurred of men being accidentally wounded by the 0·303 magazine ball; each of these affords such astonishing proof of the correctness of the deductions arrived at that there can no longer be any reasonable doubt that a very large proportion of wounds in future campaigns will be of the mitigated nature anticipated. I am in possession of the particulars of two such cases. One occurred at Aldershot, and came under my own observation; the other happened at Woolwich, the particulars of which have been supplied to me from the records of the case. These two cases are so instructive, and afford such clear evidence of the diminished wounding power of the rifle, that I am tempted to supply a short abstract of each of them.

Case No. I.—On 19th February, 1890, a labouring man, aged 36, was at work loading a cart with gravel in rear of the rifle ranges at Aldershot, when he was shot through the right thigh by a bullet from the 0·303 magazine rifle. The missile which struck him had travelled about 1 mile and 800 yards, and had ricocheted from the surface of some water close to him, as well as probably also from the edge of the target or something near it. He was not knocked down immediately on being struck. I saw him one hour after receipt of the injury, and found him comfortably lying down in his cottage, and not suffering in the least from shock or from any urgent symptom, the normal characters of the pulse, respiration, and temperature being undisturbed. There was no hæmorrhage from the wound, and it caused him only slight pain. He said that when struck it merely felt as if he had been pricked through the skin with a penknife. The entrance wound was situated over the front of the middle of the thigh. It was slightly oval in shape, $\frac{3}{8}$ of an inch one way and $\frac{2}{8}$ of an inch the other, and looked like a clean punched out bit of skin. Bruising extended from $\frac{1}{8}$ to $\frac{1}{4}$ of an inch round it. The direction of the track was upwards and backwards, and apparently in a direct line for the bone, the periosteum of which must either have been grazed or was within a fraction of an inch of being so. The bone, however was not injured. There was so little destruction of tissue in the track that a probe would only pass into it for $1\frac{1}{4}$ inch. Exit wound was situated at the back of the middle of the thigh, just $\frac{1}{2}$ an inch below the fold of the buttock. It was merely a clean cut, transverse, slit in the skin without any loss of substance round it. Length, $\frac{5}{8}$ of an inch. It looked



(From a photograph of the wound of entrance taken 20 hours after the injury.)

as if a sharp, thin-bladed knife had been thrust into the flesh, and it was so unlike any bullet wound I had ever seen before that at first I could hardly credit its being one.

(From a photograph taken 20 hours after the injury, showing posterior aspect of the thigh with the exit wound.)

The wounds were treated antiseptically, and they rapidly healed. The man progressed very well and made an uninterrupted and rapid recovery. The whole track and aperture of exit united immediately by "first intention." The punched out bit of skin at the entrance wound rapidly filled in (without suppuration), and was cicatrized over by the fourteenth day. Twenty-four days after the injury the man could walk well again, and was discharged from hospital. There was no wasting of the limb, only slight stiffness on walking being felt. Some days after returning to his own home the man unfortunately contracted acute bronchitis and pneumonia, from the effects of which he died, thirty days after his discharge from hospital. A post-mortem examination of the injured limb was made, and the only indications of the bullet wound then seen were the surface cicatrices. The entire track was so united that it was found impossible to trace the course the missile had taken.

It may be of further interest to mention that the 0·303 bullet which wounded this man was found partially buried in the ground, just beyond the spot where he was standing at the time when struck. It was not splintered or damaged in any way.

Case II.—A Woolwich Arsenal operative, aged 51, while stooping down engaged in mending the bottom of a target at the Arsenal trial ranges was struck behind by a bullet from the 0·303 rifle, fired at about 100 yards from him. The ball passed completely through the upper end of the left thigh, entering posteriorly on the inner side, immediately below the fold of the nates, and making its exit on the anterior aspect of thigh, very close indeed to inner side of the femoral artery. The wounds of entrance and exit were of comparatively small size. They were both slighly ragged; some contusion extended around them, but the amount of tissue absolutely destroyed was almost *nil*. The man was not knocked down when struck. No hæmorrhage or shock resulted from the injury, and there were no urgent symptoms. The wounds were brought under immediate antiseptic treatment, and they rapidly healed without pus formation or any complication. The man was discharged to his duty thirty-two days after receipt of the injury.

These two cases are very similar; both afford striking proof that the modifications which have been introduced in the missiles of modern rifles have considerably diminished the wounding power of the small arm. In each case a man was shot completely through the largest part of the upper portion of the thigh, yet in neither instance was the wounded man knocked down, nor did any shock result. If these men had been on service, Case No. I would have returned to his place in the ranks in twenty-four days and Case No. II in thirty-two days. Had the ball been the same size as that of the Martini, *i.e.*, $\frac{1}{2}$-th inch larger in diameter, or, indeed, only a small fraction of an inch greater in transverse diameter, in Case I the femur would inevitably have been fractured, and in Case II the femoral artery opened. In both cases the small, hard, cohesive missile traversed the tissues of the body, going in and out again, without expanding or splintering, causing no lodgment of foreign body, and with little or no destruction of the parts in its track. In both instances the wounds healed rapidly by immediate union. Up to the introduction of the present form of missile this event was of such an extremely rare occurrence in the history of gunshot wounds that Sir Thomas Longmore (one of the most experienced authorities) doubts if it really ever occurred.

It has been shown that if wounds were inflicted by Martini or Snider balls in similar situations of the body as those cited in the above cases, the results would be very severe, and if not costing the wounded man his life would, at least, end his career as a soldier, and necessitate many months of treatment in the recumbent posture. From the increased range, lower trajectory, and more rapid firing power of the new rifles the number of wounded will, doubtless, in every conflict where these weapons are used, be very large and much exceed the average of what was obtained in battles up to the present date. But, however much the power of the small arm may be increased

with respect to augmenting the total number of wounded, it is highly probable that a very large proportion of the wounds will be of a mitigated nature. Wounds of the skull will, doubtless, prove as fatal with the 0·303 ball as with any other; but combined statistics of recent wars show that only about 12 per cent. of the total number of those wounded are struck in the head. From the low trajectory of the magazine rifle the proportion of wounds in this region may become somewhat increased, but a slight gain in this respect is outbalanced by the diminished effect the ball has when striking the limbs of the body; the proportion of wounds in the extremities amounting to no less than 65 per cent. of the total number of those wounded. We may safely reckon that in the next campaign the Medical Department will have to deal, after every action, with a much larger number of wounded than has hitherto been the case, and of these a great proportion will consist of slight injuries. If early and efficient treatment be at hand in field hospitals these cases will be sufficiently recovered to allow the injured to rejoin the ranks again in a few weeks. Such satisfactory results, however, can only be attained by bringing the wounded at once under treatment. A few hours' delay before the patient comes into the hands of the surgeon is often enough to preclude all chances of obtaining immediate union in a gunshot wound, and of maintaining it aseptic. It is, therefore, absolutely necessary that the treatment of the wounded should begin on the field at the earliest possible time after their injuries have been received. It has become a time-honoured principle to remove the wounded to the rear and towards the base for treatment as speedily as possible after an action. For this purpose they must be transported from the field hospitals to the stationary hospitals on the lines of communication, and passed on thence to the base, step by step. It is questionable whether this system of hurriedly evacuating wounded towards the base will be the best one to adopt in future campaigns. No doubt military exigencies may, on occasions, demand such a course, but ordinarily it appears that greater advantage will be derived from pushing a large number of field hospitals well up to the front, and thus bring the hospitals to the wounded, as well as the wounded to the hospitals.

What is most likely to be felt in future campaigns will be the want of *moving* hospital accommodation, where the *entire* treatment of a large proportion of the wounded may be carried out. According to present Army establishments, a British army corps, of approximately 36,000 men, taking the field would be provided with only 10 movable field hospitals, able to accommodate 100 patients in each, and of this number 3 are held in reserve, so that the total proportion of movable hospital beds available is 1 to every 36 men, or exclusive of reserve about 1 to 50.

These provisions would probably have proved adequate under the former principle of rapid evacuation of wounded towards the base, but since the great changes that have taken place in the infantry arm of European nations it has now become a serious question for consideration whether our movable field hospital accommodation, as provided for under existing regulations, will prove adequate in the

coming day of need, and whether it will not be advisable to make provision for the *entire* treatment of a large number of cases in the field hospitals at the front. By this method only will all unnecessary loss of strength in the fighting line be obviated, to say nothing of the great sufferings and inconveniences attending transport of wounded over long distances towards the base. The system also for rendering first aid to and removal of the wounded from the field of battle by trained bearer companies, as provided for under present regulations of the Medical Department, is an admirable one; but for future campaigns the number of bearer companies allowed to each army corps, and the strength of each individual company, will require a considerable augmentation if we wish to provide for the increased requirements which may reasonably be expected in future campaigns.

I trust that the foregoing pages will not be looked upon in the light of an adverse criticism of the Lee-Metford rifle. Nothing could be further from my intention. Competent authorities declare the weapon to be an admirable one, and it has been approved as our infantry arm; it would, therefore, ill become any Officer in the Service to offer criticisms on what has received official approval. My endeavour is to show what may reasonably be expected to result in future campaigns from the introduction of magazine rifles in general, rather than to criticize any one arm; for, be it remembered, the adoption of quick-firing guns, carrying smaller and lighter projectiles, has been a universal change throughout the armies of Europe, and not peculiar to our own. Military considerations, such as facility for supply of ammunition in the field and the great increase in effective range, will far outweigh any minor deficiencies in the new weapons as wound producers. Successive changes in armament have always necessitated alterations in tactics; it is for the authorities concerned with those matters to say what modifications in field tactics will result from the universal introduction of magazine rifles. Many questions present themselves; I do not purpose to deal with them. Such matters as the advisability of deploying from column of route at very long distances from the enemy, and of using every endeavour to prevent cavalry approaching unbroken to within charging distance of infantry, are such self-evident necessities that they must be apparent to all.

Military exigencies demand that the new form and condition of rifle missiles shall be retained with all their advantages. It is for practical gunmakers to solve the question whether it will be possible to remedy their chief defect of diminished impact shock on the body without sacrificing other material advantages.

Addendum.

Since the foregoing pages were written, I have been able to ascertain the following particulars of the Berthier magazine rifle, with which the French Army is now being equipped:—

Calibre.....	0·301 inch.
Diameter of bullet....	0·308 „
Length „	1·142 „
Weight „	205 grains.
Muzzle velocity.....	2,071 feet per second.

(Smokeless powder.)

The bullet is made of a core of hardened lead surrounded by a casing of white metal.

It is thus seen that the missile of the Berthier rifle is very similar to that of the Lee-Metford; in fact, the difference in calibre of the two weapons is so fractional that the 0·303-inch ammunition may be used for both.

NAMES OF MEMBERS who joined the Institution between the 1st July and the 30th September, 1891.

LIFE MEMBERS.

Colomb, Philip H., Lieut. R.N.
Colomb, Horace W., Sub-Lieut. R.N.
Madden, J. C. W., Lieut. 5th Bn. R. Irish Fus.
Barstow, J. B., Lieut. R.E.
Powell, L. L., Major 1st V.B. Leic. Regt.
Maclagan, R. S., Capt. R.E.
Wilkinson, C., Major R.E.

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Maunsell, F. R., Capt. R.A.
Dyas, J. R., Capt. Rl. War. Regt.
Bingham, T. H., Lieut. 4th Lan. Art. Vols.
Sichel, H. D., Capt. 3rd V.B. W. Rid. Regt.
Blundell, J. E., Major Hamp. Regt.

FOREIGN SECTION.

THIS portion of the Number, hitherto the Occasional Notes, has now become the Foreign Section, and is reserved for articles, either original or compiled, on professional subjects connected with Foreign Naval and Military matters; also for notices of Professional Books, either Foreign or English.

The Council of the Institution wish that this section shall be developed still further, and I have undertaken to continue my Editorship during the current year, with a view of aiding them in carrying out this work. It seems to me possible to make this section, and consequently the Journal, the means of keeping our Members acquainted with all naval and military progress abroad *pari passu* with that progress; and I shall be glad to receive from members of both Services, including in the latter those of the Auxiliary Forces, suggestions, information, or offers of assistance.

It is desirable, further, that I should state that, as regards editing the Naval matter in the Section, I shall have the aid of Naval Officers, thoroughly competent to give good advice and to pronounce sound opinions.

It must, however, be borne in mind that, as the change from a quarterly to a monthly issue has been made in order to ensure the more prompt publication of the Lectures after their delivery than has hitherto been the case, the Foreign Section will, as a rule, be restricted in extent during the Lecture season in the first half of the year, and will be prominent in the second half.

It is requested that communications and books for review (the latter under cover to the Librarian) may be addressed to me at the Royal United Service Institution, Whitehall Yard, London, S.W.

LONSDALE HALE,
Colonel R.E. ret.

COLONEL V. LOBELL'S[1] ANNUAL REPORTS UPON THE CHANGES AND PROGRESS IN MILITARY MATTERS DURING 1890.

Compiled by Colonel H. HILDYARD.

THIS valuable publication maintains this year the reputation gained for it by its sixteen previous annual issues. It will be, however, with a sense of relief that its customary readers will find it has resumed its normal dimensions of one volume, containing something under 500 pages.

Of these, nearly eighty are occupied with the obituary notices of deceased Generals and with the index; the remaining 413 pages contain the matter of chief interest to the general military reader.

The arrangement is similar to that adopted in previous issues. The 1st part contains the separate reports on the several armies of the universe, showing in each case the changes that have been introduced during 1890 in the laws by which they are governed, in their organization, training, and equipment.

Unfortunately that portion relating to the German Army is this year missing, owing to the continued illness of the contributor to whom for many years past this report has been entrusted. Next year's issue will, therefore, include reports for this army both for 1890 and 1891.

Twenty armies are reported on this year. Of these, France receives, as is natural, the greatest amount of attention, and occupies forty-eight pages. Italy comes next with thirty-seven pages, then Austria, followed by England, Russia, and Turkey. The smaller States come in for briefer notices; in Northern Europe, Belgium, Denmark, Norway and Sweden; further east, Montenegro, Servia, Roumania, Bulgaria and East Roumelia, and Greece; in Asia, Persia; in S. America, Bolivia and Peru. Each group has its special interest; and the strength or weakness, the good or bad organization, of the armed forces at the disposal of their components, may in many cases have an important bearing on future history.

The 2nd part comprises able treatises on the present situation of tactics in its several branches as influenced by the introduction of improved arms and of the many new means of destruction that science is placing, though as yet in an imperfect form no doubt, at the disposal of the soldier. These chapters are always amongst the most

[1] "Jahresberichte über die Veränderungen und Fortschritte im Militärwesen," 17 Jahrgang, 1890, herausgegeben von H. v. Löbell, Oberst z. Disp.—Berlin. Ernst Siegfried Mittler und Sohn. 1891. 1 vol. Pp. 490; size, 9·5″ × 6·5″ × 1″; weight 1 lb. 10 oz. Price 8*s*.

interesting and instructive in von Löbell's publication. A valuable addition has this year been made to Part II by a separate treatise on the railway systems existing in Germany, France, Italy, Austria, and Russia.

Belgium.

Artillery.—The four regiments of fortress artillery have been combined into two brigades (Nos. 3 and 4 of Artillery). The headquarters of the 3rd Brigade remains at Antwerp, those of the 4th Brigade are at Lüttich.

The whole of the field artillery has now at length been armed with new material, the provision of which was commenced twelve years ago.

Bulgaria and East Roumelia.

Recruiting.—The contingent for 1890 amounted to 16,000 men, or about 1 per cent. of the entire population. This number was allotted to the several arms in the following proportion:—infantry, 75 per cent.; cavalry, 10 per cent.; artillery, 10 per cent.; other arms, 5 per cent.

The recruits came up in the middle of September, and at the beginning of the following month the men of the 1887 class, about 14,500 men, were dismissed.

Armament.—Up to the end of the year the small-arm factory at Steyr had delivered about 52,000 Mannlicher rifles of the Austrian pattern, 8 mm. The arming of the 1st Brigade (Sofia), and of the 2nd Brigade (Widdin) was carried out in the spring; at the same period the 1882–83 reserve men were called out for fourteen days' training with the new rifle.

Camp Exercises.—From the middle of June till August, battalion exercises and field firing took place. For this purpose the troops were concentrated in camps, generally by infantry brigades, to which cavalry and artillery were in some cases added.

On the conclusion of this period exercises were carried out with the combined arms. Each column was then composed of 4 infantry regiments (8 battalions) with the necessary proportion of cavalry and artillery under the brigade commanders.

Organization.—Infantry: 6 brigades of 4 regiments of 2 battalions of 4 companies, distributed as follows:—

1st	Brigade ..	Sofia.
2nd	„	Widdin.
3rd	„	Rustchuk.
4th	„	Shumla.
5th	„	Philippopel.
6th	„	Slivno.

The peace establishment of each of these regiments is:—56 Officers and officials ranking as Officers; 1,040 to 1,071 men (including 58 non-combatants, and from 32 to 63 musicians); 28 horses.

Cavalry.—4 regiments of 4 squadrons. Peace strength, 32 Officers and officials; 668 men (including 50 non-combatants and 24 musicians); 555 troop horses, 24 Officers' horses, and 14 train horses.

The Prince's escort squadron: 7 Officers (1 military official); 203 men (including 12 non-combatants); 150 troop horses, 7 Officers' horses, 2 train horses.

Artillery.—6 artillery regiments of 4 batteries of 8 guns and 1 division of mountain artillery of 4 guns.

The peace strength of a regiment is:

39 Officers, surgeons, and officials.
650 men (including 69 non-combatants).
250 horses.

The siege battery numbers 4 Officers; 123 men, including non-combatants.

The two artillery depôts and the reserve battery joined to them have a strength of:—

13 Officers, officials, and technical superintendents.
312 men (including 15 non-combatants).
80 horses.

Pioneers.—2 battalions of 4 companies:

57 Officers, surgeons, and officials.
1,527 men (including 58 non-combatants).
28 horses.

Opoltschenie (*Landwehr*).—Lately 24 company cadres, composed of 1 Officer and 11 non-commissioned officers, have been formed for the purpose of training the men who are not called up to the colours. These men enter the Landwehr direct and are put through a course of training lasting from two to three months. The Landwehr and also the reserve men are passed after they have completed their active service (for infantry 2 years with the colours and 8 in the reserve; for cavalry and the other arms 3 years with the colours and 5 in the reserve). They remain in the Landwehr 15 years, 7 in the first levy and 8 in the second.

Denmark.

Land Defences.—These have now been practically completed. The works still in hand and not yet finished will, it is believed, be ended during the present year. The provision of guns, the placing of armoured turrets, &c., were proceeded with.

Sea Defences.—In the spring of 1890 the construction was commenced of an open sea-port in the Oese Sound, about 4 kilom. north-east of the Trekroner sea-fort.

Exercises in embarking and disembarking cavalry and artillery were carried out in Jutland on the open coast with the assistance of the fleet. A few favourable points for landing were selected by a hasty reconnaissance; beyond this, no sort of preparations was made.

Various methods of embarking were tried and new transport material was tested.

After, in 1889, a magazine rifle of 8 mm. calibre had at length been adopted for the line, endeavours were made to increase the value of the arm by the employment of smokeless powder. After a series of experiments, a suitable powder, of Danish manufacture, was adopted, and a factory has been established at Frederiksvaerk for its production.

The point-blank range, when firing at objects of a man's height, and aiming at the centre, is 465 m.: if at the bottom, 515 m. When firing at objects of the height of cavalry, and firing at the centre, it is 535 m.: if at the bottom, 585.

Egypt.

The following is the state of the native army, as derived from official publications:—

	Officers.	Men.
Command, Administration, and Staffs of the military districts	33	136
Infantry: 7 Egyptian (fellah), 4 Soudan (black) battalions, 1 reserve battalion, and 1 disciplinary company	224	7,576
Cavalry: 1 regiment (6 squadrons)	25	492
Camel corps: 1 battalion (3 companies)	12	218
Artillery: 1 depôt, 3 garrison, 1 mounted, 1 camel, and 1 mule battery	39	801
Various local troops and commands	172	309
Musicians (2 bands)	2	88
Total	507	9,620

also 663 officials, 750 horses, 320 camels, 240 mules, and 18 field guns.

The number of British Officers doing duty with the Egyptian Army is 65: viz., a Major-General, 5 General Staff Officers, 39 infantry, 2 cavalry, 6 artillery, 4 engineer, and 8 medical Officers.

The British garrison consists of 3 infantry battalions, 2 troops of cavalry, 1 garrison battery, 1 company of engineers, and the several administrative companies; in all, 3,409, including Officers.

The police, which in Cairo and Alexandria are strictly organized, and the greater number of whom are enlisted foreigners, can also be reckoned as an armed force. They consist of

		Officers.	Men.
1 division for	Upper Egypt	39	1,391
1 „	Lower Egypt	52	1,910
1 „	Cairo	25	1,227
1 „	Alexandria	19	653

In all, with detachments along the Suez Canal, 6,250.

France.

During the year 1890 no changes of magnitude took place, but great activity continued to be displayed in perfecting the military arrangements. A new regiment of dragoons was raised, and two companies per battalion were added to five rifle battalions.

The organization of the infantry of the Territorial Army and of the General Staff was altered. The Marine Infantry is to be placed under the War Office as a portion of the land forces. The Territorial Army, and the Customs and Forest departmental formations appertaining to it, were armed with the rifle M 86. The preparation of an 8 mm. carbine for the cavalry was commenced.

The raising, distribution, and embodiment of the contingent of recruits was conducted for the first time in accordance with the Army Law of the 15th July, 1889.

Law of the 21st June, 1890, *respecting Changes in the Organization of the Territorial Army.*—By Article 47 of the Law of 1875 it was laid down that in each subdivision district a territorial infantry regiment was to be formed consisting of three battalions, each of four companies, and a depôt company. But power was given to the Minister of War to specify the number of battalions for each regiment. The new law provides for the following alteration in the article:—

Each subdivision in the region is to form one regiment of territorial infantry, consisting

1st. Of battalions, the number of which is to be determined by the Minister of War, according to the number of men available;

2nd. Of a depôt company.

A second regiment is to be formed in the Aix subdivision.

The battalions have the same strength and composition as those of the active infantry regiments. The territorial regiments are to be commanded by Lieutenant-Colonels. A section of the depôt company is to belong to each battalion.

Article 34 was altered as follows: "In the event of mobilization, the troops of the Territorial Army, or corps formed especially for the purpose, may be employed in garrisoning fortified places, the Etappen lines, and important strategical points; or they may be formed into groups, brigades, divisions, or army corps to take the field, and form a portion of the Active Army. In peace-time the War Minister may combine bodies of the Territorial Army with those of the Active Army for purposes of instruction."

Law of the 24th June, 1890, *respecting Changes in the Organization of the General Staff.*—Articles 4, 5, and 9 of the General Staff Law of the 20th March, 1890, are altered as follows:—

Article 4. The Officers who have passed successfully through the higher War School and obtained the brevet d'état major, will, on leaving the school, do duty with the General Staff for two years, after which they will either continue to do duty with the General Staff or return to their corps.

In the course of these two years they will be attached for duty to

the arms other than that to which they belong, the time and duration of this to be fixed by the War Minister.

The Captains, Commandants, and Colonels of the General Staff must do duty in the charge of their rank with the arm to which they belong. The Officers who have fulfilled this condition before joining the General Staff, or who have commanded a regiment as a Lieutenant-Colonel, are exempted from this rule. In time of war it ceases to apply.

Article 5. In peace, the number of General Staff Officers is fixed at 640, viz., 30 Colonels, 40 Lieutenant-Colonels, 170 Commandants, and 400 Captains. These Officers are seconded, continuing to belong to their arm, in which they are promoted. The War Minister fixes the number to be seconded in each arm.

Article 9. The Office Staff consists of, at most, 180 clerks of various ranks. They are placed under the General Staff Officers, and are employed in office duties and in keeping the records. They are formed into a special corps.

The changes were considered necessary because the rule that an Officer is not to be employed longer than four years continuously on the General Staff had not been carried out; the number of the General Staff Officers was too few, and it had, therefore, become necessary to detach Officers from the troops to the General Staff.

Law of the 2nd July, 1890, *respecting the calling up of Men belonging to the Reserve of the Territorial Army for Drills in Peace-time.*—The men of the Territorial Army Reserve, who would in war be employed in guarding the lines of communication, are, by this enactment, placed under the obligation of coming up once during their nine years' liability, for training in their special duties, during a period not exceeding nine days.

Law of the 9th November, 1890, *regarding an Alteration of the Recruiting Law of the 15th July*, 1889.—In time of peace, soldiers situated as follows may, on their own request, be allowed, when they have completed one year's service, to remain in their home till transferred to the Reserve:—

1st. The eldest of orphans having neither father nor mother, or of motherless orphans of whose father it has been officially declared that it is not known whether he is dead or alive, or who has been placed in restraint.

2nd. The only or the eldest son, or, in the absence of a son or of a son-in-law, the only or the eldest grandson, of a widow, or of a wife of whose husband it has been officially announced that it is not known whether he is dead or alive, or who has been placed in restraint; or of a father who is blind or 70 years of age.

3rd. The eldest or only son of a family of at least seven living children.

In the cases 1 to 3, in the event of the eldest brother being blind or altogether incapable of earning a livelihood, the next eldest may claim to be dismissed.

4th. The eldest of two brothers taken for service in the same year.

5th. The brother of a man serving actively as an Officer.

The conditions under 4 and 5 apply to the cases in which two brothers are bound in the ordinary course to serve during three successive years, in which circumstances one of them only serves for one year.

6th. The brother of a man who has died in active service or has been invalided on account of injuries incurred by the service.

The foregoing indulgences apply only to legitimate children.

Recruiting.—The recruits of 1889, enrolled under the new law, in 1890 numbered in all 193,473, including those whose enrolment had been deferred from earlier classes. This was about 51,000 more than in the previous year.

The scholars of various public schools and institutions permitted under Article 59 of the Recruiting Law to serve as one year volunteers, were restricted to the infantry, artillery, and engineers, not exceeding ten per regiment.

Ordinary volunteers are enlisted for three, four, or five years. The numbers are limited:—

In an infantry regiment to....	30	
In a rifle battalion to	20	
„ Zouave regiment to.....	100	
„ cavalry „	40	
„ Spahi „	20	
In an artillery regiment to....	40	(in 4 regiments to 75)
„ engineers' regiment to ..	150	
In a fortress artillery battalion to	20	

The numbers are unlimited in the Algerian tirailleurs, the foreign battalions, and the battalions of Algerian light infantry. In the artillery artificer and laboratory companies they are taken in number as required.

Reserves.—The Reserve men belonging to the 1881 class were called up by means of public proclamation, the training being extended over different periods, according to the arm or branch of the service. The period of training was generally twenty-eight days. In all, about 153,000 were called up, distributed as follows:—

Infantry	99,500
Cavalry.....	7,000
Artillery	25,850
Engineers.....	3,150
Administrative troops...	8,500
Gendarmerie	100

Of the men exempted by the Recruiting Law of 1872 from service in time of peace, 76,700 were called up for training during a period of seven weeks.

From the 1st November, 1890, until the 31st October, 1891, the composition of the Army by year's classes is the following:—

Active Army	Year's classes	1889, 1888, 1887.
Reserve of the Active Army....	,,	1886 to 1880.
Territorial Army.....	,,	1879 to 1874.
Reserve of the Territorial Army	,,	1873 to 1865.

Remounts.—The total number of horses for the year 1891 is 142,870, an increase of 4,569 on last year. The Estimates provided for the purchase of 15,037 horses; the prices were fixed at the following rates:—

	Officers' horses. francs.	Troop and draught horses. francs.
Cuirassiers.....	1,400	1,160
Dragoons.....	1,260	1,030
Light cavalry	1,140	910
Artillery.....	1,260	1,030
Infantry (Arab breed)..	760	(1,000 for draught horses)
Military schools.....	—	1,030
Cavalry in Algeria	—	600
Mules.....	—	650

Defences.—Valenciennes, Givet, Douai, and Arras have been removed from the list of fortified places.

New works were commenced on the Italian frontier; of these Fort Vulmis, designed to block the road from Italy to Grenôble and Chambéry is of special importance.

In the autumn the work of removing the old ramparts round Lyons was commenced, to be replaced by new defensive works further in advance. The negotiations between the military and the civil authorities regarding the levelling of the western portion of the ramparts round Paris were nearly completed.

At Belfort, Toul, and Verdun small railway lines were constructed communicating between the detached forts and the central fortress.

Military Telegraphs.—By a Decree of the 29th April, this service, which, in 1876, was transferred from the charge of the Engineers to the General Staff, was again placed under the Engineers.

The carrier-pigeon service is attached to that of the telegraphs, and the ballooning service is also in charge of the engineers. By the instructions of the 5th May on the above Decree the Military Telegraph Direction and central depôt attached to it were placed under the immediate orders of the War Minister.

The Direction is charged with the provision and maintenance of the entire material, the carrying out of experiments, and the training of the personnel. All the arrangements for the rapid mobilization of the directions, parks, and sections, as well as for the organization of the territorial service, are elaborated in each region by the Chief of the Staff, the Commanding Engineer of the Army Corps, and the superior telegraph officials, who are for this purpose permanently attached to the General commanding the Army Corps.

The previously existing section of the Army General Staff has been

abolished, and the engineer branch, in concert with the 1st and 3rd sections of the former, has charge of all the arrangements respecting the organization and mobilization of the telegraph service, the letter-carrying, pigeons, and balloons, also of the employment of these services in the field and the training of the personnel.

Balloons.—During the manœuvres, a balloon detachment was attached to the 1st Army Corps, with results which were stated by the military press to have been satisfactory. At the Central Balloon Establishment at Chalais, near Meudon, special courses of instruction were held for the men of the balloonist companies, for the Engineer Officers in charge of the material in the fortresses, and for General Staff Officers. The training of the Engineer Officers extended to all branches of the practical working, including ascents of both captive and free balloons. That of the General Staff Officers comprised instruction in the employment of captive balloons for purposes of obtaining information and in the method of communication with the ground by means of the telephone.

Military Budget.—In 1891, for the first time, the items formerly provided for in the extraordinary budget have been transferred to the ordinary budget. They were classed under the 2nd section as extraordinary expenses, in contradistinction to the ordinary expenses. Compared with the preceding year, the expenses borne under the 1st section are 11·3 million francs more, and those included under the 2nd section 46 millions less. This reduction is due, not to any saving, but to the credit of 770 millions voted in December, 1888, and to be distributed over five years, having now been extended over a longer period.

The total amount for the year is 675,729,040 francs, of which 567,669,040 are allotted to the services under section 1, and 108,060,000 to those under section 2. Of the latter nearly 24 millions are estimated for small-arms, 15 millions for field artillery material, 8 millions for barracks, nearly 7 millions for siege artillery material, 1 million for the fortresses on the northern frontier, 8 millions for those on the east, and 3 millions for those on the south-east. The estimates were based on an effective peace strength of:—

26,934 Officers and officials.
520,548 men.
733 Officers } of the Gendarmerie.
25,062 men }
142,870 horses.

These numbers show an increase of 1,038 Officers, 16,899 men, and 4,569 horses over those in 1890. But, as a fact, the average number rationed, that is, those actually present on an average, daily, with the colours, are only 8,000 more than last year.

Conseil Supérieur de la Guerre.—By a Decree of the 10th April the provisions for the members of the Superior Council of War entrusted with special missions were extended to include their undertaking the inspection of one or more Army Corps, the main point to be kept in view being their state of preparedness for war. The Generals con-

cerned receive their orders from the Minister of War. At these inspections, which may be made unexpectedly, all the officials and troops have to carry out unconditionally all the orders of the Inspectors of Army Corps, as the members of the Superior Council entrusted with these inspections are called. These Officers must arrange for the mobilization of the troops and the administrative branches; also for the arming of the works in fortresses, and report to the War Minister on these points as well as on the efficiency of the Commanders and the troops. It is noticeable that in the Decree the permanent allotment of Army Corps amongst the Inspectors is not provided for. This may be due to political reasons and considerations regarding the secrecy of the mobilization plans being maintained.

Of the members of the Superior Council, four act as Army Inspectors, who would, in the event of war, command the several armies. They are the Divisional Generals Billot, Duc D'Auerstadt, Thomassin, and Gallifet.

General Staff.—By a Ministerial Order, dated the 12th February, the officers and departments of the War Minister's[1] General Staff were distributed between two newly-formed branches, of which the first is placed under the first Sub-Chief of the Staff, and the second under the second Sub-Chief.

To the first branch belong:

The 2nd office	.....	Study of foreign armies.
„ 3rd „	.....	Operations and training.
„ 4th „	.....	Railways.

To the second branch belong:

To the 1st office—organization and mobilization.
The section for the personal affairs of the General Staff.
„ matériel and accounts.
„ military telegraphy.
„ military history.
„ African affairs.

The Cabinet of the Chief of the Staff remains as before.

Further changes were made in the organization of the General Staff by a Ministerial Decree, dated the 6th May. In the report of the War Minister that is printed with it, the necessity is shown for the General at the head of the General Staff becoming in time of war the Chief of the Staff to the Commander-in-Chief. It is urged, also, that he should not be affected by the change of War Ministers, due generally to political reasons, and of which there have been 12 within 14 years. The separation of the personnel into two portions is required in peace, of which one portion would, on mobilization, be transferred to the headquarters of the armies, and the other would deal, as heretofore, with the affairs of the central services. Everything relating to administration must be eliminated from the duties of the General Staff. The title of "The War Minister's General Staff" would no longer be applicable to the changed conditions, and

[1] For details of War Ministry, see Annual Reports, &c., 1887, p. 16.—H. H.

it should be replaced by the name "General Staff of the Army," so as to guard against the impression that these officials are a sort of General Secretariat, or an extension of the Minister's Cabinet.

The following are the contents of the Decree:—

Art. 1. The existing General Staff of the War Minister will assume the name "General Staff of the Army." The Lieutenant-General at its head will bear the title "Chief of the General Staff of the Army." He is situated directly under the Minister, at whose orders he is placed.

Art. 2. In war a portion of the personnel of the General Staff of the Army will be employed to form the General Staffs of the field armies. The Chief of the General Staff of the Army will assume the position of Major-General.[1] The remaining portion, with that of the Sub-Chiefs, remain with the Minister, in order to secure the execution under his orders of the central duties. The division of the personnel will be regulated beforehand by direction of the Minister.

Art. 3. The General Staff of the Army is responsible particularly for dealing with those questions that relate to the defence of the territory generally, and to the preparation of the military undertakings relating thereto.

To this belongs: the mobilization of the Army and its concentration on the outbreak of war; the employment of canals, railways, telegraphs, and balloons; the organization and arrangement of the service in rear of the force; its organization and training, and the preparation of the larger manœuvres in peace; the collection of statistical and historical materials; the military missions abroad; the preparation and participation in the work of the Superior Council of War, or of those members of it entrusted with special tasks. The geographical service, also, belongs to the General Staff of the Army.

Art. 4. The Chief is responsible, under the superintendence of the Minister, for the conduct of General Staff services, as well as for the selection and training of the Officers belonging to it. He prepares them in peace-time, by means of schemes and General Staff tours, for the duties they will have to perform in war.

Art. 5. The Chief of the General Staff of the Army can give directions to Commanding Generals in respect of matters relating to his duties. In regard to this he has the same rights and privileges as the Generals nominated to be army Commanders in the event of war.

In execution of this Decree, the geographical service was placed under the Chief of the General Staff of the Army from the 15th May, and its Director given similar rank and position to a Sub-Chief of the General Staff. The working and administration, also, of the military telegraph service was removed from the sphere of the General Staff, and handed over to the Engineers, by whom all matters relating to the technical training of the personnel and its application in the field are to be worked out in concert with the General Staff. The attachment of the balloon service to the telegraphs was effected at the same time.

[1] In the French army the Chief of the Commander-in-Chief's Staff.—H. H.

On the 4th June Lieutenant-General Thomassin, in his capacity as Inspector-General, ordered the mobilization of the General Staff of the 5th Army Corps in Orléans. This extended to the necessary preparatory measures, the loading of the General Staff wagons and of the services attached, and to the inspection of the entire material to be taken into the field.

After passing the examination at the École Supérieure de la Guerre the following obtained in 1890 the necessary qualification for employment on the General Staff:—

Infantry	13	Captains,	27	Lieutenants.
Cavalry	9	„	9	„
Artillery	17	„	1	Lieutenant.
Engineers.....	2	„	—	„
Gendarmerie ...	—	„	1	„
Marine infantry	2	„	—	„
Total.....	43	„	38	„

Intendance.—The corps of the "intendance militaire" was on the 1st January, 1890, composed as follows:—

4 Intendants-General.
25 Military Intendants.
62 Sub-Intendants, 1st class.
94 „ 2nd „
95 „ 3rd „
49 Adjoints.

There were, besides, 250 intendant officials in the Reserve and Territorial Army.

The whole of the instructions concerning the organization and duties of the intendance were collected in the Decree of the 10th February (L'Avenir Militaire, No. 1450, of the 21st February). The sphere of its duties includes the control and regulation of supplies in money and kind, clothing and payment for it, also the rationing arrangements for the Officers and men not belonging to any formed body of troops. In each Army Corps or Military Government the whole of these duties are conducted by an Intendant-General or a Military Intendant, who has the title of "Director."

Should there be two of these in one region, the one acts as director of the service of intendance with the Army Corps, the other occupies the same position in regard to those troops not belonging to the Army Corps, and to the establishments of the administrative branches.

The Minister of War decides as to the number of intendance officials and administrative Officers. Officials of the intendance may be replaced during absence or incapacity for duty, not only by the sub-prefects and general secretaries of the prefectures as heretofore, but also by Staff Officers and Captains in the garrisons concerned, or, exceptionally, by the mayors.

Marine Infantry.—A completely new organization has been given to the marine infantry. That portion of it in France is, in the event of war, to be employed in support of the land army, and embodied with it. The intention is to form from it a new Army Corps (the 20th), to be dissociated from the Marine Department and placed under the Minister of War.

Since the 1st March, 1890, the marine infantry has been composed of 177 active companies formed into 12 regiments, 4 independent battalions, and 5 detachments. Of these, 166 are in the country and 61 in the colonies. Two combined battalions, to which the 8 companies are detached from the regiments in Cherbourg, Brest, and Rochefort, have belonged to the garrison of Paris since the middle of July, 1890. Each two regiments at home are placed under a Brigade General; two Division Generals of the marines act as Inspectors-General.

The following table gives the strength and the garrisons of the several regiments :—

1st Marine Infantry Regiment, 14 companies, in 4 battalions, Cherbourg.
2nd Marine Infantry Regiment, 14 companies, in 4 battalions, Brest.
3rd Marine Infantry Regiment, 14 companies, in 4 battalions, Rochefort.
4th Marine Infantry Regiment, 18 companies, in 5 battalions, Toulon.
5th Marine Infantry Regiment, 14 companies, in 4 battalions, Cherbourg.
6th Marine Infantry Regiment, 14 companies, in 4 battalions, Brest.
7th Marine Infantry Regiment, 12 companies, in 3 battalions, Rochefort.
8th Marine Infantry Regiment, 16 companies, in 4 battalions, Toulon.

Each of the regiments numbered from 1 to 4 has also a company of non-combatants.

Outside France there are the 4 following regiments, which will be relieved at fixed periods by portions of the regiments numbered from 1 to 8 :—

9th Marine Infantry Regiment, 12 companies, in 3 battalions, Tonkin.
10th Marine Infantry Regiment, 12 companies, in 3 battalions, Annam.
11th Marine Infantry Regiment, 12 companies, in 3 battalions, Cochin China.
12th Marine Infantry Regiment, 8 companies, in 2 battalions, New Caledonia.

And, besides these, there are the 4 independent battalions and the 5 detachments in other colonies.

The following also belong to the marine troops:—

1 regiment Senegal tirailleurs, 12 companies, in 3 battalions;
1 „ Annamite „ 12 „ 3 „
3 regiments Tonkinese, 36 companies, in 9 battalions;

and three more independent battalions.

Infantry.—Three rifle battalions, the 10th (St. Dié), the 15th (Remiremont), and the 17th (Rambervillers), were each increased by a 5th and 6th company. Consequently, of the 30 rifle battalions, 17 are now composed of 6 companies each. Of these, 12 are Alpine chasseur battalions, stationed in the 14th and 15th regions; the remaining 5 are in the 6th region, on the north-east frontier. Money has been taken for raising, during 1891, 6 companies, so as to increase 3 more battalions to 6 companies each.

The total strength of the infantry for 1891 is—

1,357 superior Officers.
10,515 Officers (Captains and Lieutenants).
327,035 non-commissioned officers and men.

The increase over 1890 is 110 Officers and 12,234 men, who are granted so as to increase, on an average, each company by 20 men.

Arm and Ammunition.—The requisite number of rifles, pattern 1886, for the whole of the formations of the 2nd line, were to be completed in 1890.

The following distribution of the ammunition carried in the field is taken from the "Aide-mémoire de l'officier de l'infanterie en campagne":—

Each infantry man carries on him	108·0	rounds.
In the company wagon there are in each of the two ammunition boxes, M/87, 7,808 cartridges, which gives per man.....	61·4	„
In the battalion ammunition wagon there are carried 25,920 rounds, or per man	25·9	„
In the ammunition column, sections 1 and 2, there are per man	65·7	„
In the artillery park per man	43·5	„
„ army park „	105·0	„
Total rounds per man	409·5	„

Principles for the Employment of the Arm.—With individual fire good results may be looked for at—

110 yards against a man lying down.
330 „ kneeling or standing.
490 yards against a single horseman.
660 „ group of four men.

Collective fire may be delivered up to—

880	yards	against	an	object	with the breadth of a group.
1,095	,,	,,	,,	,,	half peloton.
1,315	,,	,,	,,	,,	peloton.
1,640	,,	,,	,,	,,	company column.
2,200	,,	,,	,,	,,	troops in assembly formation or column of march.

At all distances up to 660 yards the 440 yards sight is to be used.

Cavalry.—As a part of the scheme of 1887, under which the Minister of War was empowered to raise 12 new cavalry regiments, 1 new regiment, the 29th Dragoons, was formed in 1890. Six new regiments had been constituted during the two previous years, and money has been taken in the Budget for 1891 to provide for 2 more. This year, therefore, 9 out of the 13 contemplated will have been constituted.

Arms and Equipment.—The manufacture of a new 8 mm. carbine was commenced on the 1st May in the small-arm factories, and the whole of the cavalry will be armed with it. The carbine will have a removable magazine arrangement; it has a range of 2,200 yards. Its length is 37·65 inches.

In specifying the articles of clothing and equipment to be carried with the troops in the field ("Bull. Off. part. régl." No. 49), the lance is not mentioned as to be taken. It is inferred from this that this arm, which is now carried by the front rank of dragoon regiments, is to be done away with, although no instruction has as yet been issued to that effect.

New Regulations.—The frequently-observed misapplication and misappreciation of the Regulations of the 23rd October, 1883, for service in the field has led to the issue of a special instruction entitled "Observations sur l'emploi des troupes de cavallerie appellées à opérer avec les détachments de toutes armes." In this, amongst other points, the necessity is insisted on for dividing the cavalry attached to the detachment into two portions, the independent and the advanced guard cavalry. The functions of the former will be to search the ground in the direction of the advance; to gain and maintain touch with the enemy; to secure, in combination with the advanced guard, the march of the column; to establish communication between the several portions of the latter, and to furnish outposts in concert with the infantry. The advanced guard cavalry, on the other hand, provides for the protection of the column from unexpected attacks by the enemy. The division of the cavalry into two groups, independent one of the other, had been left before to the discretion of its commander. By the new instruction, the commander of the detachment is responsible for this duty, and the decision as to the strength of each group. If the weak strength of the cavalry attached to a detachment makes it appear undesirable to make a division of it for the purposes of reconnaissance and security respectively, the whole of the cavalry must be employed in the latter way, and the reconnaissance service performed by single Officers' or non-commissioned officers' patrols.

Artillery.—No changes have taken place in the organization of the artillery; but it is intended this year (1891) to increase the peace strength of the field artillery by 580 Officers and 2,738 men.

It is probable that there will be a further increase to provide for the requirements of the new 20th Army Corps, the formation of which is contemplated.

The marine artillery, which it is intended to place under the Minister of War, consisted, on the 1st July, 1890, of 22 batteries in France, besides 13 batteries and 2 detachments in the colonies. Of the former, there are 7 batteries at Lorient, 5 at Cherbourg, 3 at Brest, 2 at Rochefort, and 5 at Toulon.

According to the "État militaire du corps d'artillerie," on the 1st April, 1890, the following was the distribution of the fortress artillery, in which many changes had been made:—

1st	Battalion:	Staff, 2, 4, 6 batteries Lille, 3 Dunkirk, 6 Calais, 1 Havre.
2nd	„	Staff, 3, 4, 6 batteries Maubergе, 1 La Fère, 2 Hirson, 5 Valenciennes.
3rd	„	Staff, 2, 3, 4, 6 batteries Reims, 1 Givet, 5 Mézières.
4th	„	„ 1, 2, 4, 6 batteries Verdun, 3 Montmédy, 5 Longwy.
5th	„	Staff, 1, 3, 4, 6 batteries Verdun, 2 Gironville, 5 Camp des Romains.
6th	„	Staff, 2 to 6 batteries Toul, 1 Erouard.
7th	„	„ 2, 4, 6 batteries Langres, 1 Paris (Fort Domont), 3 Paris (Fort Palaiseau), 5 Pont St. Vincent.
8th	„	Staff, 2, 4, 5, 6 batteries Epinal, 1 Manonviller, 3 Remiremont.
9th	„	Staff, 1 to 6 batteries Belfort.
10th	„	„ 2, 3, 6 batteries Besançon, 1 Pontarlier, 4 Dijon, 5 Montbéliard.
11th	„	Staff, 2, 5, 6 batteries Lyons, 1 Albertville, 3 Marseilles, 4 Modena.
12th	„	Staff, 4, 5, 6 batteries Grenôble, 1 Mont Dauphin, 2, 3 Briançon.
13th	„	Staff: 4, 5, 6 batteries Nice, 1, 2 Toulon, 3 Ajaccio.
14th	„	Staff, 4, 5, 6 batteries Bayonne, 1 Perpignan, 2 Marseilles, 3 Nantes.
15th	„	Staff, 2, 5, 6 batteries St. Servan, 1 Cherbourg, 3 Brest, 4 Port Louis.
16th	„	Staff, 1, 3 to 5 batteries Rueil (military government of Paris), 2 Mont Valérien, 6 Poitiers.

The 19th and 20th (foot) batteries of the 12th and 13th Artillery Regiments also belong to the fortress artillery, and are stationed in Algeria and Tunis.

Artillery Matériel.—A change has been made with the 90 mm. field gun by which 5 men are carried on the limber in place of 3. Of

these, 3 sit facing the horses, as heretofore; the remaining 2 face the gun.

An explosive shell has been introduced for the same gun, 4 calibres in length, fitted with 1·4 kg. crésylite and a small mixture of melinite. Each battery carries 75 of these explosive shells; the ammunition sections and the artillery park carry further 18 rounds per gun.

A new weak-smoke powder was introduced.

New regulations were issued in 1890 for the supply of ammunition in the field. In the introduction, stress is laid on the importance of the timely renewal of expended ammunition. It is one of the most important duties of the leaders of every grade to provide for this being punctually carried out during an action by the échelons in rear, so as to enable the first lines to concentrate the whole of their attention on the course of the fight. The ammunition supply consists of that with the fighting line (with the troops and the fighting train) and that carried with the army corps and army parks. The number of rounds carried altogether with the batteries, artillery ammunition sections, and corps park is 257 per 90 mm. gun, and 304 or 142 rounds for the 80 mm. gun, according as the battery belongs to the corps artillery or to the cavalry divisions.

Gendarmerie.—In April, new instructions were issued for the field gendarmerie. Besides the general provisions regarding the duties of the military police in the field, the publication contained some interesting information respecting the composition of the fighting and regimental trains respectively.

Their place in a column on the march is as follows:—Troops, fighting train, ambulances, regimental train, and convoys.

The requirements in ammunition and matériel for an engagement are carried with the fighting train; it follows directly after the troops, and after it come the ambulances. Provisions and baggage are carried in the regimental trains. To the convoys belong the provision columns, the artillery park, the mobile remount depôt, and the field hospitals.

The regimental trains are combined in special columns, which follow the troops and the fighting trains at a certain distance, which is always to be specified. As they do not march with the troops, a special escort must be detailed for them.

Before the commencement of the march, the regimental trains will be collected or they will join the marching column in succession, according to the situation of the places where they have been disposed for the night. On the conclusion of the march, the transport joins the troops to which it belongs by the shortest route.

The following table shows the composition and strength of the regimental train belonging to the several bodies of troops.

	Provision and forage wagons.	Baggage wagons.	Sutlers' wagons.	Official wagons and wagons for superior Officers and officials.	Treasury and post wagons.
Infantry regiment....	13	5	3	—	—
Rifle battalion.....	4	2	1	—	—
Cavalry regiment	12	5	2	—	—
Group of divisional artillery	12	2	1	—	—
Corps artillery	33[1]	5	2	1	—
Engineer company ...	2		—	—	—
Artillery ammunition section	4	—	—	—	—
Infantry ammunition section	4	—	—	—	—
Bridge train	7	1	—	—	—
Headquarters of an infantry brigade	—	—	—	1	—
Headquarters of a cavalry brigade	—	—	—	1	—
Headquarters of an infantry division	2	—	—	5	3
Headquarters of a cavalry division.....	1	—	—	3	2
Headquarters of an army corps.....	5	—	1	17	6

From this table it appears that the vehicles belonging to the regimental train for the whole army corps number 256 or 328, according as it contains 8 or 12 infantry regiments.

Supply.—New regulations were issued on the 22nd August respecting the supply of provisions of the army in the field and the provision of the requirements for bivouacking. They occupy 450 pages with numerous appendices, and are named "Réglement sur le service des subsistences militaires et du chauffage en campagne." They are printed in the "Bulletin Off. part. régl.," No. 53. A Ministerial instruction of the 19th May ("Progrés Mil.," No. 1001, 7th June, 1890), gives more details in regard to the composition and weight of the rations on service.

There is a distinction between "heavy" and "ordinary" rations. The former are to be issued during the course of the operations; the latter in those periods of a campaign when no special exertions are demanded from the troops. Besides the rations, the issue of "special additions" is authorized. The Commanders of armies and army corps have to make the necessary arrangements regarding the nature of the supply.

[1] There are 3 sutlers' wagons with the eight ammunition sections which are attached to the 4th, 6th, and 7th sections respectively.

The heavy ration is composed of—	The ordinary ration is composed of—
750 g. bread or 700 g. biscuit.	The same as the "heavy."
500 g. fresh meat, or	400 g., or
360 g. bacon.	240 "
250 g. preserved meat.	200 "
100 g. dried vegetables.	60 "
750 g. potatoes.	450 "
30 g. lard, or	The same as "heavy."
40 g. suet.	" "
16 g. salt.	" "
21 g. sugar.	" "
16 g. roasted coffee, or	" "
19 g. unroasted coffee.	

Strength of the Land Forces.—The application of the Law of the 15th July, 1889, will, according to "La France Militaire" (No. 1928), produce the following numbers:—

Active army: 577,319 men, besides 26,934 Officers, 98,583 Volunteers and re-engaged men, and 25,795 gendarmerie.

Reserve of the Active Army: 985,702 men.

Territorial Army: 994,614 men.

Reserve of the Territorial Army: 1,266,192 men.

This gives a total available strength of 3,823,807 Officers and men.

If to these numbers be added formations of the forests and customs, of the military railway service, the men of the military auxiliary service, and the marine troops, the grand total would be about 4,125,000.

Territorial Army.—Various changes were introduced in the organization and arming of the formations composed of the forests and customs officials, which form a part of the Territorial Army. The rifle M/86 has been issued to the number of 25,000 to the forests formations, and of 70,000 to the customs formations. A number of officials holding the position of Officers and non-commissioned officers were called up in each forest district for five days' instruction with the nearest infantry regiment. On their return they were to instruct the whole of the formations in handling the new arm.

By a Decree dated the 15th March, the military organization of the customs officials in Algeria was rearranged. In each of the three provinces a foot company and a peloton of cavalry was constituted.

The military organization of the forest officials is based on the Decree of the 18th November. The companies, sections, and detachments formed from forest officials belong to the armed forces of the country, and are destined, as a rule, in their own districts, to take part in the operations of the field armies and in the defence of the fortified places. At most, 4 Officers—the Captain Commandant is mounted—16 non-commissioned officers, and 2 buglers are attached to a company. The whole of the formations are at the disposition of the War Minister, even, in case of necessity, before the order for mobilization is issued. It is permissible to call up individual units in peace for inspection in those districts in which they would be employed in war. The whole of the forest officials not included in these formations join the troops formed of the Reserve or Territorial Army. Even after the expiration of their legal period of military service, the

officials remain available for employment in time of war, and can only be freed from this obligation by unfitness. The scholars at the School of Forestry at Nancy receive, during their period of study, a special military training, and, after passing the final examination, are appointed to the Reserve as Sub-Lieutenants.

The number of formations composed of forests and customs officials respectively is given by the "Annuaire" for 1890:—

	Customs officials.	Forests officials.
Active formations....	32 battalions.	46 companies.
	3 companies (Algeria).	4 squadrons (Algeria).
	3 pelotons of cavalry (Algeria).	4 squadrons (Algeria).
Fortress formations ..	6 battalions.	2 companies.
	22 companies.	18 sections.
	10 sections.	15 detachments.

By a Ministerial instruction of the 28th March, all belonging to the Territorial Army have to attend a training of 14 days' duration during the first, second, or third year of their service in it.

The infantry of the Territorial Army, consisting previously of 145 regiments, each of 3 battalions and 1 depôt company, received by the Law of the 21st June a new organization. By its provisions the infantry regiments will in future be formed, as a rule, of three battalions, numbered from 3 to 5, and 1 depôt company. The 1st and 2nd battalions, together with the 4th battalion of the corresponding Line regiment, the cadre of which already exists in peace-time, will form so-called "mixed" regiments, and bear a number greater by 200 than the Line regiments. These mixed regiments are commanded by active Lieutenant-Colonels, and the rolls are prepared in peace-time. Only those men in the youngest classes who have been completely trained during a three years' period of service with the colours are included in the two territorial battalions of the regiment. The purely territorial regiments are, therefore, for the most part composed of men belonging to the reserve of the Territorial Army. Of the mixed regiment, a half of the whole number are apparently to be employed with the active formations, and, according to the Press, are to form a third regiment to each of the infantry brigades. The remainder would be formed into Reserve divisions. The formation of duplicate army corps to be composed exclusively of bodies of men belonging to the Territorial Army has been given up.

The number of Officers has increased in a marked manner since the previous year. In the "Annuaire" there are 18 Lieutenant-Colonels, 210 Battalion Commanders, 960 Captains, and 1,694 Lieutenants or Sub-Lieutenants of infantry shown as unattached, the posting of whom to the new formations is intended.

Greece.

Railways.—A concession has been has been given to a Belgian company for the construction of the Peloponnesian Railway. The lines to be made are: 1st, Pyrgos—Pylos—Meligala; 2nd, Leontari—Sparta—Xirocampo. Both lines must be connected with the section Mylos—Calama. Their construction is to be completed in 5½ years. The Athens—Piræus—Pyrgos Company was granted a concession to extend their line to Olympia and Ayos—Joannis. The Piræus—Athens—Peloponnesus Company has determined to construct a branch line by Pyrgos—Olympia—Caritaini—Cavassia—Kyllini.

Peace Establishment.—In the autumn of 1890, the following was the strength of the Army:—

1,956 Officers.
24,152 non-commissioned officers and men.
3,729 horses and mules.
120 guns.

Italy.

Recruiting.—The Law of the 2nd July, 1890, fixed the numbers of the recruit contingent, 1st category, at 82,000, and decided for the third time that the whole should remain for 3 (cavalry 4) years with the colours. The total contingent numbered 106,176, of whom 77·23 per cent., *i.e.*, 81,773, were taken for the 1st category and 24,403 for the 2nd category. A Commission of General Officers assembled to consider the Organic Law of 1888, recommended the extension of the period of obligatory service to the completion of the 42nd year of age. According to this, the 1st and 2nd categories would belong for 10 years to the Permanent Army and its Reserve, 6 years to the Mobile Militia, and 6 years to the Territorial Militia. The 3rd category would belong, during the whole 22 years, to the last formation. This entailed an increase of 3 years to the period of liability.

Available Forces.—According to the published report of General Torre, dated 1st January, 1891, the following was the strength of the forces on the 30th June, 1890:—

1. *The Permanent Army.*—Officers serving, 14,528; unattached, 4,867; at disposition, 182; total, 19,578.

Men with the colours, 248,539; on permanent furlough: 1st category, 380,942; 2nd category, 188,208; total, 823,504. This total is composed of 22,859 non-commissioned officers, 109,857 corporals, 690,788 lance-corporals and men.

2. *Mobile Militia.*—Officers, 359; Reserve Officers, 3,454; men, 1st category, 194,144; 2nd category, 172,254. Total, 372,211, composed of 3,813 Officers, 8,231 non-commissioned officers, 29,409 corporals, 330,698 lance-corporals and men.

3. *Territorial Militia.*—Officers, 5,838; men, 1st category: non-commissioned officers, 11,698; corporals, 57,346; lance-corporals and men, 242,091; total, 311,135.

2nd category: 959 non-commissioned officers, 1,230 corporals, 155,926 lance-corporals and men; total, 217,095.

3rd category: 574 non-commissioned officers, 2,807 corporals, 214,716 men with, and 879,294 without, training; total, 1,097,391.

The whole number, therefore, of the Territorial Militia amounts to 5,838 Officers and 1,625,021 men, of whom more than half are untrained.

The grand total gives 35,972 Officers and 2,817,523 men.

Training.—In April, 1890, the third part of the Provisional Infantry Regulations was issued, entitled "Exercise of several Battalions. Conduct and Duties in the Fight." At the same time a supplementary instruction was issued, containing directions for tactical exercises. As was the case with the 1st and 2nd parts previously issued, the 3rd shows a decided inclination to the German regulations. It is penetrated with the same spirit, and affords the widest scope to the independence of the leaders, giving at the same time indications that are of the greatest value. In a similar manner, as some were not satisfied with the freedom of movement in the German regulations, and wished for a "normal attack," so also has the military Press in Italy directed much criticism against the accentuation of the initiative. But, without doubt, by far the preponderating number of Italian Officers are very well satisfied with it, and the freedom of action introduced has already borne fruit on the manœuvre grounds of 1890.

Colonial Forces.—In January, 1890, the African possessions occupied by Italy were consolidated into the colony of Eritrea. In the same month, exactly three years after the catastrophe of Dogali, three columns marched from Asmara to Adua, the capital of Tigre, without firing a shot. The colony has now been placed on a permanent peace footing, under a combined civil and military governor, with a council of civil officials. This new administrative system has led to material alterations in the constitution of the military force of occupation, in which native formations preponderate more and more.

By a Decree of the 28th August, 1890, the following organization of the special corps was adopted:—Two battalions of rifles, with 3 Officers, 16 men, 3 Officers' horses, 30 pack animals for the Staff, and 4 companies, each composed of 5 Officers and 140 men. Total, 46 Officers, 1,152 men, 16 horses, and 60 pack animals.

1 battalion bersaglieri of 3 companies, 18 Officers, 400 men, 7 horses, 24 pack animals.

1 mountain battery of 6 guns, 4 Officers, 157 men, 8 horses, 143 riding and draught animals.

1 company fortress gunners: 6 Officers, 200 men, 6 horses.

1 company artillery artificers: 3 Officers, 128 men, 3 horses.

1 company sappers: 16 Officers, 360 men, 10 horses.

1 company specialists: 7 Officers, 250 men, 7 horses.

1 sanitary company: 5 Surgeons, 120 men, 5 horses.

1 company supply troops: 5 Officers, 250 men.

1 train company: 8 Officers, 100 Italians, 57 natives, 130 riding, draught, and pack animals.

Total of special corps: 109 Officers, 3,124 men, 401 riding, draught, and pack animals.

A Decree of the 3rd September ordered the following composition of the native troops to be gradually carried out:—

6 battalions each of 4 companies, with 90 Italian and 48 native Officers, 42 Italian non-commissioned officers, 4,800 natives, 144 riding and 228 pack animals.

1 squadron of cavalry for Asmara (3 subdivisions mounted on horses, 2 on mules): 5 Italian Officers, 25 Italian non-commissioned officers and men, 121 natives, 81 horses, 71 mules, 10 pack animals.

1 squadron for Keren (3 subdivisions mounted on horses, 1 on mules), as above, but with 115 horses and 48 mules.

In addition a camel detachment of 14 men and 10 camels.

1 mountain battery: 6 guns, 4 Italian Officers, 16 Italian non-commissioned officers and men, 165 natives, 8 horses, and 127 mules.

Netherlands.

A new Army Law has been drafted, introducing the system of obligatory service. The strength of the Army is designed by it to be 116,000 men, of whom about 45,000 would belong to the Field Army, 30,000 to the garrison, 20,000 to the Reserve troops, and 20,000 to the depôt troops. The Landwehr, to be composed exclusively of men who have served with the colours, will number about 50,000 infantry and fortress artillery (Landwehr men who have served in the other arms will, on mobilization, go to the depôts of those arms). There will besides be an Ersatz Reserve of about 150,000 men available, and finally a body of about 58,000 men, who have no military obligations in peace, but will be called on to perform special duties in war.

The system is based on the principle of universal service. The obligation commences with the 20th year of age. A yearly contingent of at most 13,200 men is to be called up for a complete training with the Army (1 year for the dismounted and $1\frac{1}{2}$ years for the mounted branches). At most 2,500 men will also be called up yearly for a period of three months' training, and then drafted to the depôts.

The yearly contingent for the active Navy (1 year's training) is 600 men.

The duration of service in the Army is 8 years, and in the active Navy 6 years; in the Landwehr 6 years, and in the Seewehr 5. For both services 13 years in the Ersatz Reserve. The Reserve troops are to consist of the three oldest contingents of the land forces, and are first formed on the occasion of mobilization; their cadres, however, are to be always kept up.

Finally, from 20 to 40 years of age all not otherwise in military service can be called up for the Landsturm.

Austria-Hungary.

During 1890 the completion of the organization was continued extensively. The increase to the peace and war establishments of the whole of the troops of the regular forces and of both Landwehrs, the formation of a new cavalry regiment for the Army and of a new cavalry brigade for the Hungarian Landwehr, the increase of the field as well as of the fortress artillery, the introduction of smokeless powder, and the arming with the magazine rifle of almost all infantry of every category not already in possession of it, are the leading points in the organic and technical development of the Army during the year.

Military Legislation—Landsturm.—In Austria, as in Hungary, the Landsturm has a much higher object than was formerly the case. Its destination is not only to support the Regular Army and the Landwehr, but further to relieve these forces from the provision of the auxiliary services of a technical, administrative, and sanitary nature, and of Officers and men to maintain the forces at their proper strength.

To the Landsturm belongs the preparation and enrolment:—

1st, of combatants of the Landsturm formations, viz., bodies of troops as garrison and etappen troops; also of bodies of troops, detachments, look-out posts, &c., for watching the frontier and defending the home territory.

2nd, of those liable to service in the Landsturm for special services, such as technical and administrative workmen, train, transport, and the care of the sick and wounded.

3rd, of the supply of drafts to replace the casualties in the Army, Navy, and Landwehr.

The entire number of men subject to Landsturm service form 24 classes, of which the oldest includes those 42 years of age and the youngest those of 19. These classes are placed in two groups or "levies." The 1st levy includes 19 classes, being those from 19 to 37 years of age inclusive; the 2nd levy comprises those from 38 to 42 years inclusive.

Other provisions deal with the provision of Landsturm Officers from the following sources:—

1st, from Officers transferred to the Landsturm from the Regular Army and from the Landwehr.

2nd, from Officers no longer on the Active List, who are unemployed on the ground of 40 years' service, and from those who have been invalided or pronounced unfit for service in the Army, Navy, or Landwehr, but are still suited for local or Landsturm duties.

3rd, from Officers on the Retired List.

4th, from military officials who are retired or unemployed, who have formerly been combatant Officers, if coming under 2, 3, or 4, they have not completed 60 years of age, are fit and hold no situation in war in the Army, Navy, or Landwehr. Every Officer or official is, according to the Landsturm law, to be considered fit, who in the opinion of the assessors is capable of service with the Landsturm.

5th, from civilians, preference being given to those who have formerly been Officers, and who, not having committed any dishonourable action, have left the Army, Navy, Landwehr, or Gendarmerie, either before or after the completion of the legal term of service.

The distribution of the individuals designated as Landsturm Officers rests with the Landwehr territorial command, the following order of procedure being observed:—

First in order come the Ersatz formations for the Army and the Landwehr; then the Landsturm marching battalions, the Landsturm territorial battalions, and, lastly, the special formations.

In order to give an opportunity for qualifying themselves to those civilians who are candidates for the position of Lieutenant in the Landsturm, but do not possess the required military qualifications, they are permitted to attend: in Austria, the Landwehr Officer aspirants schools established in the Landwehr regiment stations; in Hungary a special course, instituted each year in the Landwehr (Honvéd) infantry or hussar regiment station.

When the Landsturm is called out, either wholly or in part, the independent Landsturm battalions, and in Hungary, also, the Landsturm hussar squadrons, are organized.

To the Staff of each of the 186 Landwehr battalions (82 Austrian, 10 Tyrol, 94 Hungarian) are attached in peace an administrative and registration Officer and a Landwehr District Feldwebel to register the Landsturm troops to be called up in the event of war, and to look after the arms and equipment in the magazines. These stores are kept in the augmentation magazines of the several Landwehr battalions. In the Tyrol alone there are six independent Landsturm armories. The arms are the Werndl breech-loading rifles with which the Army and Landwehr were formerly armed.

But for those Landsturm detachments destined to join the Army or the Landwehr to fill vacancies (preference is given to those men in their 33rd and 34th years), there is left in the augmentation magazines, besides a sufficient reserve of clothing, equipment, and field stores, also a supply of magazine rifles M 1888.

At the headquarters of each Landwehr battalion there are sufficient stores and other preparations to admit of the formation of three Landsturm battalions. In the first place, the marching battalions are formed from the Landsturm men of the whole Landsturm district who have received military training; men from other districts are only to be included when required.

The rest of the Landsturm men who are not included in the above formations are required for Ersatz purposes with the Army, Navy, or Landwehr, or included, according to their places of residence, in the territorial battalions that are formed, having regard to the judicial and political distribution.

The battalions, like those of the Landwehr, are named and numbered after the Landsturm districts; for example:

Villach No. 27/3.

The places of formation for the marching battalions are, in principle, the stations of the respective Landwehr battalions or Land-

sturm districts. Those for the territorial battalions are the principal places of the districts from which they are formed. These latter are to be determined on by the Landwehr territorial Commander on the proposition made in accordance with the general instructions by the Landsturm district Commander, who has to be careful to obtain the concurrence of the civilian district officials.

A marching battalion is composed of the Staff and 4 field companies, each of 4 sub-divisions; the 1st battalion has, further, 1 Ersatz company of 4 sub-divisions. The composition and strength of a Landsturm battalion (26 Officers, doctors, and paymasters, 947 men, and 14 horses) are, therefore, generally the same as in an independent battalion of the Army.

Two Landsturm hussar squadrons can be formed at the headquarters of each of the ten Honvéd hussar regiments.

Those persons liable to service with the Landsturm who are not employed with the Army, Navy, Landwehr, or Landsturm formations are to be utilized for special services in connection with the armed forces, according to their personal qualifications, trades, &c.

Such services include their employment as tradesmen in the Army, Navy, or Landwehr establishments, in connection with the Sanitary services, as well in the establishments of the Army and Navy as in the field and stationary establishments of the Red Cross Society, &c., in the supply services, with the train as drivers, pack-animal leaders, tradesmen, and conductors for transport columns, on works connected with fortifications and communications, industrial undertakings for the benefit of the Army, &c.

Recruiting.—Of 734,191 registered in the three first classes by age as liable, 63,581 did not come up; 154,146 were found to be fit, and 514,978 unfit.

The numbers taken were: for the Army, 87,696; for the Austrian Landwehr, 7,622; for the Hungarian Landwehr, 6,232; and for the Ersatz Reserve, 59,347.

Strength of Armed Forces.

Regular Army and Reserves.—Officers, 21,375; other ranks, 939,884. This shows an increase over the previous year of 56,921—chiefly to the Ersatz Reserve.

Bosnia and Herzegovina.—18,290 men.

The number of recruits found fit and enrolled in 1889 was 72 per cent. of those liable.

Austrian Landwehr.—3,150 Officers and officials, 192,300 men.

Hungarian Landwehr.—3,430 Officers and officials, 211,509 men.

The total numbers shown by the official returns, including all the component parts of the forces—that is, the Army, both Landwehrs, and the Bosnian-Herzegovinian troops—were 35,922 Officers and military officials and 1,461,983 men.

The peace establishments are as follows:—

Distribution.	Officers.	Men.	Horses.
Army	16,958	257,058	50,750
Austrian Landwehr	1,610	9,500	5,600
Hungarian Landwehr	1,679	15,849	8,870
Bosnian-Herzegovinian	181	4,120	8
Total	20,428	286,527	65,228

In the above table, under the Landwehr, the horses are shown that are given out for private use, for they are broken in, and are available for use by the cavalry regiments at the manœuvres or on special occasions.

Repeating Rifle and Carbine.—The whole of the dismounted troops of the Army and the Landwehr have already been armed with the 8 mm. magazine rifle. The further output of these rifles by the Steyr rifle factory are not for the troops but for the reserve store in the Vienna artillery arsenal. The employment of smokeless powder has necessitated the introduction of a new and stronger cartridge case, M 1890.

For two years trials have been made with the cavalry carbine pattern, the mechanism of which is essentially the same as that of the small-bore magazine rifle M 1888. One of this pattern has been adopted, and the Steyr small-arm manufactory has made every preparation to commence the manufacture of the new cavalry magazine carbine on a large scale in May, 1891.

Smokeless Powder.—A preparation that had formed the subject of experiments for some years has been adopted as fulfilling the necessary conditions for use with small arms, and it can also be used with field guns. A Government factory has been established for its manufacture, and further experiments will be made with a view to producing a more perfected substance.

Guns, Quick-firing Guns, and Mitrailleuses.—The work of increasing the reserve store of steel-bronze siege guns, which has been going on for some years, was continued during 1890, and especially the ammunition for these guns was correspondingly increased.

In order to restrict the corps artillery to batteries of one calibre, by which the disposition and reserve supply of the ammunition would be materially facilitated, and with a view, also, to increasing the effects of the fire, orders were issued to replace the two light batteries of the 2nd battery division in each of the 14 corps artillery regiments by heavy batteries. This had the further advantage, that the corps artillery could be divided into two battery divisions, each of three heavy batteries; whereas, hitherto, owing to the difference in the calibre, the first battery division was composed of four heavy batteries, and the second of two light ones.

The separation into "light" and "heavy" batteries has, therefore, ceased. The whole of the field artillery has the 9 cm. uniform

calibre. Only the horse artillery batteries have the 8 cm. gun; the normal mountain batteries have the 7 cm. gun. The four-horsed mountain batteries have guns of 9 cm. calibre.

The armaments of the fortified works at Arad, Karlsburg, Cattaro, Castelnuovo, Essegg, Franzensfeste, Komorn, Peterwarden, Cracow, Przemysl, Pola, Trent, and Malborghetto have, during the past two years, been in part strengthened and in part modernized. With this point in view, the following classes of ordnance were included in their armaments:—

Field guns M 1875, to replace the muzzle-loading guns M 1863, previously employed in large numbers as sortie and movable guns.
12 cm. steel-bronze siege guns as long-range guns.
15 cm. steel-bronze defence mortars for vertical fire.
Lastly, quick-firing guns and mitrailleuses for defence against assault.

The mobile siege battery groups organized experimentally in former years have now been definitely introduced into the reserve matériel of the artillery. Each of these batteries of four guns consists of one 15 cm. rifled mortar, one 12 cm. gun, both M 1880, and a 12 cm. short gun (howitzer). These batteries collected in groups are intended to take an intermediate place between the field and the siege artillery and provide for an effective high-angle shrapnel fire. The regulations, indeed, contain provisions for its employment by the field artillery; but, as its batteries do not include guns specially constructed for high-angle fire, the employment of such guns has been decided on for special situations. In the mobile siege battery the mortars and howitzers represent these guns for high-angle fire. The groups are eventually to be placed under the Corps Commanders, that is, they will be attached to the corps artillery. In order to fulfil the requirements necessary to adapt them to field work they must have sufficient mobility. This appears to have been secured, for the weight of the body of the gun and the carriage, constructed of steel plates, together is not in excess of the packed 9 cm. field gun. They are to have teams of six horses, so they can follow the troops everywhere. But, on account of their weight, no ammunition is to be carried in the limber. The ammunition is carried exclusively in the ammunition wagons.

Railway and Field Telegraph Matériel.—In order to be able to effect the difficult service of restoring interrupted railway communication in the shortest possible time, it has been decided to equip the railway companies with portable railway bridges. The provision of portable field railway matériel, commenced in 1889, was continued last year.

It was decided also, as noted in the last "Annual Reports," to establish cavalry telegraphs. From the experiences gained, the necessity has been accepted for replacing the existing field telegraph equipment by a lighter and more appropriate arrangement, by which the first line of the field telegraphs shall consist only of a field cable carried on light vehicles. The field telegraph equipment previously in use is to

be employed for the connection of the army command with the reserve telegraphs. The equipment of the cavalry telegraphs will be completed during 1891, and the provision of a further number of light telegraph detachments is contemplated for next year.

Having in view the transport by rail in the event of mobilization, it has been deemed advisable to make preparations in certain large railway stations for the rapid and assured refreshment of the men. To this end, cooking apparatus has been placed in many stations that have been decided upon as stations at which the troops would be fed.

Field Sanitary Matériel.—As a consequence of the adoption of the antiseptic method of treating wounds, the entire bandaging matériel of the military hospitals has been completed as required by the system.

The number of the forty-four already existing infantry division sanitary establishments and that of the field hospitals were each increased by two and the necessary matériel provided.

Equipment with Explosives.—The dynamite previously carried by the technical troops in the field has, from late experiments, been shown not to fulfil the conditions now required in an explosive for use in the field. It has been found from trials carried out with iron bridge trestles constructed of particularly tough material, that the amount of the ordinary explosive required to destroy such a bridge is materially greater than formerly. And, lastly, the cylindrical form of the dynamite discs used in free charges, such as are employed in the explosions applicable to the field, only allow of the partial use of the explosive power of the charge. It has, therefore, been considered necessary to provide the technical troops with a higher explosive—ekrasite—for the destruction of communications in war. It is of greater power, especially against very strong iron constructions, and can be made up in a form favourable to the whole of its explosive power being utilized.

Fortifications.—Various measures were taken to increase the power of resistance of the two Galician fortresses, with reference to which the report attached to the Army Estimate for extraordinary expenditure contained the following remarks:—The advances made during recent years in the sphere of technical matters connected with the artillery and the construction of works demand an increased power of resistance in fortified works, for which the application of the means hitherto available no longer suffices.

With a view to rapidly placing the exposed fortresses of Cracow and Przemysl in a state of preparation and also to place them in a condition to carry out their object by offering a lengthened resistance, a number of measures are required to be taken, the successive execution of which must be regarded as not subject to postponement.

These measures consist in the new construction of permanent works, in the restoration of the auxiliary works in accordance with the present aims of fortification, in making permanent the most important of the outlying works, still retaining their provisional style, in the insertion of armoured constructions, in securing the bomb-proof

buildings from the effect of high explosive projectiles, in masking the fortified works, in completing the communications, &c.

Numerous reconstructions in the older works or new constructions were also taken in hand in Jaroslau, Komorn, and the barrier forts in the Southern Tyrol and in Carinthia.

The Infantry and Rifles.—The new edition of the Organic Constitution for the infantry does not contain any important alterations, but only the completion of certain details.

In future, as previously, each of the 102 regiments is to consist of the regimental Staff, 4 field battalions each of 4 field companies, and the Ersatz battalion of 4 Ersatz companies, of which the cadres only exist in peace. Besides these formations, on mobilization each Ersatz battalion has to supply a Staff subdivision, of which every two form a Staff company. The Landsturm men are formed into Ersatz companies before they are drafted to the field formations.

In war, the field company consists of 4 Officers, 1 substitute, 56 non-commissioned officers and lance-corporals, 180 men, 4 pioneers, 2 buglers, 2 drummers, 3 bearers, and 4 Officers' servants; total, 236 men. An Ersatz company has two establishments, the normal and the maximum. The normal consists of 5 Officers, 57 non-commissioned officers and lance-corporals, 160 men, 3 buglers, 3 drummers, and 5 Officers' servants; total, 233. The maximum has 140 men more, or, in all, 373 men. The war train of a field regiment consists of 76 men, 144 horses, and 40 wagons.

In every regiment there is in peace a Captain of the 1st Class for special duties in connection with instruction and arms. For every magazine rifle there are 40 rounds allowed for non-commissioned officers, and 100 for lance-corporals and men. Each battalion details 2 corporals and 16 men for the so-called regimental pioneer detachment. For sanitary duties each regiment provides 1 Feldwebel, and each battalion 1 corporal and 12 men as bearers and 2 to carry bandages. The establishment of reserve Officers is 10 per cent., and that of the regiment 6 per cent, greater than the estimated war requirement.

The men serving voluntarily beyond the legal period are limited to 150 per regiment.

The rifle troops consist of the Tyrol Emperor's Jäger Regiment with 12 field batteries and 3 Ersatz battalions, and 30 independent field battalions, each of which has 1 Ersatz battalion. The company organization is generally the same as that of the Line.

The Increase to the Cavalry.—In 1888, the number of effective horses present with each regiment was increased by 1,025. In 1890 a further increase occurred by the raising of the 15th Upper Austrian Dragoon Regiment at Wels and Enns.

The cavalry of the Army now consists of 15 dragoon, 16 hussar, and 11 lancer regiments; total, 42. Each of these regiments is composed of the Staff, 1 pioneer detachment, 2 divisions, each of 3 field squadrons, 1 reserve, 1 Ersatz squadron, and of 2 subdivisions of Staff cavalry, of which 1, with the Staff, is formed from horses in private use, and the other with the Ersatz cadre, from enrolled horses.

The pioneer detachment numbers 1 Officer, 27 men, 28 horses. Both in peace and in war, the field squadron has 1 Captain, 4 First Lieutenants and Lieutenants, 15 non-commissioned officers, 1 trumpeter, 130 soldiers; total, 5 Officers, 166 men, 161 horses. The establishment of the regiment is as follows:—

Staff (with two division Staffs): 1 Colonel, 2 Staff Officers, 1 Regimental Adjutant, 1 Supply, 1 Pay, and 3 Medical Officers, 1 Veterinary Surgeon, 2 sergeants, 1 staff conductor, 1 regimental, 2 division trumpeters, 56 dismounted men (1 artificer, 1 armourer, 42 drivers, 2 butchers, 10 officers' servants), 1 sutler, with 1 assistant; 106 horses, 36 two-horsed vehicles. The whole regiment (including the pioneer section) numbers 41 Officers, &c., 1,088 men, 1,101 horses, 36 two-horse vehicles; of these riding in the ranks, 933.

Increased Establishment of the Fortress Artillery.—The reorganization of the fortress artillery has been undertaken in the following manner:—

1. The existing 12 fortress artillery batteries to be converted into—

(*a.*) 3 Fortress artillery regiments, each of 3, and 3 regiments, each of 2 battalions; also 3 independent battalions. The whole, therefore, will form 18 battalions, each of 4 companies, and in peace the cadre of 1 Ersatz company.

(*b.*) An independent battery division for the Tyrol with 3 mountain batteries and an Ersatz depôt cadre in peace; to form 6 mountain batteries and an Ersatz depôt in war.

2. The appointments of Fortress Artillery Directors Cracow, Przemysl, Pola, Komorn, Cattaro, Trent, Karlsburg, and Peterwarden are abolished. Their duties are to be performed by the Commandant of the fortress artillery regiments or independent battalions stationed at those places.

3. A General of Artillery will be appointed at Vienna and one at Buda-Pesth as Inspectors of Fortress Artillery. To each will be attached a Captain for the office duties and a Subaltern Officer as Adjutant.

The Tyrol mountain battery division has been added to the field artillery.

Landwehr.—The war strength of the Landwehr field companies is fixed at the same numbers as for the Regular Army, which gives 25 Officers and 1,586 men per battalion when the Ersatz company is at its maximum strength. Similarly, the Landesschützen battalions are of the same strength as the rifle battalions, and the total number, including the Ersatz companies as above, is 1,660.

In peace, the cadre of each Landwehr (or Landesschützen) battalion consists of 12 Officers (including the Pay and Register Officers) and 94 men. The period of service for the men with the instruction cadre is only 1 year; but a portion of the recruits, drafted direct into the Landwehr, are dismissed after only 2 months' training. The exercises during each second year last 4 weeks, which is a week less than in the Hungarian Landwehr.

Of the 22 battalion cadres, the 4 Dalmatian battalions and the 10 Tyrol-Vorarlberg Landesschützen battalions are independent. The

remaining 78 Landwehr battalions are formed into 22 regiments, the Staffs of which are formed in peace. Of higher Staffs there are the Landwehr commands; but these are not independent like the division commands in Hungary. They are under the corps Commander, who acts as the Landwehr Commandant.

In the cavalry, the same system is adopted as in Hungary with regard to horses, which is that, after 6 months' breaking in, they are handed over to private individuals, who are bound to return them in good condition when required for manœuvres or on mobilization. The peace strength of the regiment is 9 Officers, 80 men, 88 horses. Each regiment receives 112 remounts yearly, which are bought in 2 lots, and ridden for 5½ months.

Recruits are not drafted direct to the Landwehr cavalry, as is the case with the Honvéd formations, with the exception of some men for officers' servants, &c. The men of the cadres consist of reserve men of the Regular cavalry, or of cavalry soldiers liable to Landwehr service, who serve voluntarily as rough riders. Only those men who have completed their Line and Reserve service in the Regular cavalry are called up for the 4 weeks' exercises, and form 4 squadrons, each of 150 men.

Whereas in Hungary, three cavalry brigades are formed under a Landwehr Cavalry Inspector, who in war acts as Cavalry Divisional Commander, in Austria two Colonels or Lieutenant-Colonels are employed as Inspectors.

In addition to the 6 regiments, there is also a cadre of mounted Landesschützen in Tyrol-Vorarlberg and of mounted rifles in Dalmatia. The men of both are furnished from recruits. The enlisted men have to serve for 1 year, and afterwards for 4 weeks every second year.

Hungarian Landwehr.—The endeavour to make the Landwehr an effective 2nd line to the Regular Army has been evidenced during the last few years by the completion of the magazines with field stores, camp equipment, vehicles and harness, &c. A step further was taken in 1890 by increasing the cadres, which resulted in a material addition to the active list of Officers by nearly 400 infantry and hussar Officers. As the actual establishment of Honvéd Officers was too weak to provide for the increased cadres, many Officers of the Army, who volunteered and who were of Hungarian nationality, were transferred to the Honvéd.

The new organization has created a close analogy between the Army and the Landwehr. Whereas formerly there was only one cadre for each Honvéd battalion, now each company has a cadre of 2 Officers and 24 men. The Staffs for the 92 field battalions and the 28 regimental commands are on the active list. The strength of the companies is raised twice in the year—generally in the spring and in the autumn at the great manœuvres—to 100 men, and often more, by calling up the Reserve men for a period of 5 weeks; and whereas formerly each of the 10 Honvéd hussar regiments had only 4 squadrons, they have now 6 and an Ersatz cadre, like a cavalry regiment of the Army.

The difference, therefore, consists only in the shorter term of service of the men in the Landwehr and in the numbers generally present being weaker by three-quarters. The active period of service in the Honvéd is only 2 years, whereas in the Army it is 3. On the other hand, the exercises for the Reservists every alternate year last in the Army only 4 weeks, but in the Honvéd 5. Indeed, in practice this period of training is in the Army completed in 13 days, whereas in the Landwehr the whole of the 5 weeks is fully utilized, so as to make up for the shorter period of the original term.

As, further, the Staffs of the brigade and divisional commands are in existence there would be no difficulty in mobilizing an infantry division in each of the 7 Hungarian-Croatian Landwehr districts (Buda-Pesth, Szegedin, Kaschau, Pressburg, Stuhlweissenburg, Klausenberg, Agram), and also a cavalry division and an independent cavalry brigade from the 3 cavalry brigades in Arad, Fünfkirchen, and Buda-Pesth. The necessary wagons and equipment for mobilization, together with the reserve stores, are ready in the magazines and depôts. The artillery and technical detachments required would be detached from the Army. With this in view, each of the 14 corps artillery regiments has, besides its normal complement of batteries, 2 on a lower establishment of 2 guns. An 8th horse artillery battery division of 2 batteries, each of 6 guns, is told off for the Honvéd cavalry division. The necessary detachments of engineers and pioneers are drawn from these regiments respectively.

Sanitary Establishments and Troops.—New organic arrangements have been adopted.

1*st: Infantry Division Establishments.*—Each with 3 Surgeons, 2 Officers, 95 men, as well as 52 men and 94 horses of the train, 3 baggage wagons, 3 sanitary ambulance wagons, 11 wagons for wounded, 2 sanitary material reserve wagons, 2 sanitary requisites wagons, the whole four-horsed. The field sanitary column of the German order, to which are attached 13 men of the sanitary troops and 23 men with 23 horses of the train. The infantry division hospital establishment with mountain equipment consists of 5 Surgeons, 1 Apothecary, 4 Officers, 103 men of the sanitary troops, 1 Officer, 107 men of the train, with 78 horses and 83 pack animals; the vehicles are those of the above named. The infantry division sanitary establishments provided with the new train matériel have 7 field hospital pack wagons, 11 wagons for wounded men, and 3 baggage wagons, all four-horsed.

2*nd: Cavalry Division Establishments.*—Without their own Surgeon, with 4 Officers, 107 men of the sanitary troops, 14 men with 25 horses of the train: 1 baggage wagon, 4 wagons for wounded, 1 sanitary requisites wagon.

The field hospitals, divisible into 3 sections, each for 200 wounded, have with field equipment each 10 Surgeons, 1 Curator, 3 Pay Officials, 4 Apothecaries, 1 armourer, 2 smiths, 25 men of the sanitary troops, 1 conductor, and 56 drivers. The vehicles are undergoing revision. The field hospitals with mountain equipment, which is differently constituted, can be divided into 3 sections and 6 half-

sections. A wounded transport column of the Red Cross is attached to each field hospital, with 1 Officer, 20 men, 15 two-horse wagons for wounded, 1 four-horse sanitary fourgon, 1 operations double tent, and 13 drivers. 1 field hospital is calculated per division.

Houses, each for 500 slight cases and convalescents, are established as required. Movable reserve hospitals, each for 600 wounded, serve to relieve the field hospitals which must be rendered capable of movement again quickly. They are divided into three portions, termed units. Halting stations for the sick, established on the lines of communication, serve in part only for changing bandages, refreshment, and feeding, partly also to provide rest for the night.

The railway sanitary trains furnish accommodation for 104 wounded, and have an establishment of 2 Surgeons, 1 Apothecary, and 25 men of the sanitary troops. The Maltese Knights' Society have special trains of their own.

Field Supply Establishments.—The following are amongst the more important points in the new organization for the supply services:—

The field supply establishments include the combined provision columns of a combined division of troops with 2 days' rations, consisting of the supply detachment, with 2 officials and 9 men, and the train detachment, under the command of the Subaltern Officer belonging to the 1st subdivision of the train squadron. The establishment of vehicles is for the infantry division, 90 wagons; for the cavalry, 20, all two-horsed; for the artillery, 18; for the ammunition park, 12; for the sanitary service, 2; for the Divisional Staff quarters, 2; in all 144 vehicles. A cavalry division of 4 cavalry regiments and 2 rifle battalions has 183.

The field supply columns, of which each division has 2 with 2 days' rations, consist of the supply detachment, 2 officials and 9 men, and of the train detachment composed of country carts, strengthened by 2 or 3 subdivisions of the divisional train squadron, or is formed from country carts with an escort. In the first case the train detachment numbers 1 Officer and 117 men, and in the other case the escort is composed of 1 Officer and 35 men. The column has 197 vehicles. The corps, army, and chief command Staffs receive at their stations a supply train with 4 days' rations.

The field supply magazines are, as a rule, divided into 9, exceptionally into 6 échelons; 3 échelons, with each 2 days' rations, are estimated for each infantry or cavalry division.

The field bakeries consist of 3 sections; each of these is furnished with 16 oven wagons, or with country wagons to convey the ovens, and are divided into 4 sets of 4 ovens. The supply detachment with these numbers 9 persons for supervision, and 79 in each section. The train detachment consists of 48 persons, and has 313 country vehicles. Each bakery carries with it a supply for 6 days.

The slaughter cattle depôts are divided into 3 sections, each of which comprises the personnel required for looking after and driving 3 droves of cattle (50 to 100 head). The supply detachment consists of 4 persons for supervision, 7 for each section and the train of

28 country carts. The drivers (1 for 20 beasts) are taken from men liable to Landsturm service.

The reserve supply magazines (with 24 persons of the supply branch) are established as required.

The reserve bakeries furnished with iron ovens are divided into 3 sections, of which each forms 6 sets of 4 ovens. The establishment of the supply detachment is 9 for supervision and 114 for each section. Reserve bakeries with brick ovens are constructed when necessary for baking biscuits.

Reserve slaughter cattle depôts are established as required.

For mountain warfare each infantry division has 3 mountain supply columns with 51 persons, a train detachment equipped with pack animals, and an escort provided by the train. Mountain bakery ovens are also formed.

Bosnian-Herzegovinian Troops.—In 1890, 4 new companies and 4 Ersatz cadres were formed. Each of the 4 battalions now consists of 9 companies and an Ersatz cadre. A 10th company is to be formed this year in each of the district stations, the strong battalions are to be subdivided and 4 regimental commands established.

Cavalry Telegraph Service.—In order to render possible the maintenance of telegraphic communication between the advanced cavalry divisions and the army telegraph system, and also to allow of the cavalry generally utilizing existing telegraph communications to the greatest extent for its own correspondence, the establishment of cavalry telegraphs is contemplated for war purposes. A cavalry telegraph course has been introduced for the training of those Officers and men who would be employed with the cavalry telegraph formations.

Roumania.

Defensive Works.—Of the 18 forts projected for the defence of Bucharest, 14 are in course of construction. Great difficulties have been experienced owing to water lying near the surface, which renders it necessary for all the interior spaces to be cemented, and may necessitate the employment of iron caissons, which would increase the expense by 25 per cent. Only two forts are approaching completion as regards the masonry work: "Fort Kitila" on the Verschowa-Jassy line and "Fort Giliva" on the Giurgevo line.

None of the intervening batteries are yet begun. The circular road which is to connect all the forts is being made.

The competition for the provision of the armoured towers is not yet completed, but a decision may be expected during 1891.

The whole of the works on the line of the Sereth are nearly completed up to the newly designed flank position at Odobesti.

At Foksan there are 3 lines: in the 1st line, 41 batteries; in the 2nd, 15; and in the 3rd, 15.

At Naomlasa 2 lines: in the 1st line, 22 batteries; in the 2nd, 8.

At Galatz 3 lines: in the 1st line, 29 batteries; in the 2nd, 10; in the 3rd, consisting of two divisions, 3 in the 1st and 9 in the 2nd.

The whole armament is complete and consists of Krupp 12 cm.

guns, Gruson 12 cm. howitzers, and 37 and 53 mm. quick-firing guns. The guns are stored in depôts, only at Foksan is a battery mounted for the training of a fortress company. Ammunition is only in part available for the Foksan line, and there is none for Naomlasa and Galatz.

If, therefore, ammunition were available, the Sereth line could be made capable of defence by the end of 1891; but as it is, even supposing the necessary consignment to be ordered in the course of the year, it will be 3 or 4 years before the delivery can be completed.

Reorganization Project.—The following are some of the principal proposals for alterations in the Organic Law of the Army, and in its general organization, prepared by the War Minister for consideration by the Chamber:—

1. The period of service in the Standing Army to be 3 years for all arms; the service in the flotilla-corps is now for 5 years.
2. The recruiting to begin on the 1st November instead of on the 1st December as heretofore.
3. The establishment of the 8 line regiments to be raised from 2 to 3 battalions.
4. The 33 regiments of the Territorial Army (Dorobanzi), each of 2 battalions, to be converted into 24 regiments, each of 3 battalions, which will necessitate the formation of 6 new battalions.
5. The establishment of the permanent Dorobanzi company, formed the previous year, to be raised by 18 men.
6. In the Dobrudscha, a Zouave battalion to be formed from the Mahommedan population and attached to the 33rd Dorobanzi Regiment.
7. From the 12 cavalry regiments of the Territorial Army (Calaraschi) the 7th, 8th, and 11th Regiments of the 4th Army Corps and the 6th of the 3rd Corps, to be each 4 converted into a permanent regiment of 4 squadrons of 4 officers, 130 men, and 110 horses.
8. A fourth Rossiori regiment to be formed.
9. The existing 4 companies of 89 men of the fortress artillery battalion to be converted into 1 regiment of 8 companies, each of 100 men.

The proposal advanced in 1889 to form a 5th Army Corps has been dropped.

Russia.

Finland Dragoon Regiment.—This formation is being gradually raised, three squadrons on a weak effective having been formed in 1890, to be followed by the other three this year. In 1892 the whole 6 squadrons will be raised to their full strength.

Artillery.—To the 2 field-mortar regiments of 4 batteries, formed in 1889, a third was added of the same strength in 1890. The results of the formation and of its employment for the attack on covered objects are thought highly of in Russia. In December the order was given to form during 1891 three new light Reserve batteries, to be added as seventh batteries to the 2nd, 4th, and 5th

Reserve Artillery Brigades. These new batteries are only to have 2 guns on a peace footing, but would on mobilization be raised to complete strength.

The introduction of mortar regiments, of which one had the opportunity of proving at least its mobility at the manœuvres in Volhynia, has given an impulse to the discussion whether it would not be preferable for the field artillery also to adopt 4 batteries as the regimental unit instead of the existing brigade organization of 6 batteries. The battery is no longer the tactical unit: but has been replaced by the group of 3 or 4 batteries. For this purpose the brigade of 6 batteries is too large, especially as the tendency of the present battle tactics, as was evidenced at the large manœuvres of 1890, is not so much to aim at obtaining a mass of artillery fire from one spot; but rather to arrange for a concentric fire by different groups from different and changing positions.

Fortress Mining Companies.—The 4 torpedo companies, previously existing for the defence of the east seaports and the Black Sea, have been disbanded, and 8 fortress mining companies created in the fortresses of Cronstadt, Sweaborg, Viborg, Mouths of the Danube, Otschakof, Sebastopol, Kertch, and Michaelovsk. The object of this virtual extension of the former torpedo companies is to provide for special troops to assist in the defence of the fortresses in war by laying submarine torpedoes or mines. To this end matériel for training with the necessary steam and row boats for instruction are maintained in each fortress. In war the number of boats would be increased by purchase or hire.

The fortress mining companies belong to the engineer troops.

Fortress Telegraph Detachments.—From the 1st January, 1891, detachments with parks were established in the fortresses of Warsaw, Novogeorgiovsk, Brest-Litovsk, and Ivangorod. The personnel will be taken from the existing field telegraph parks, completed, as regards Officers, from other branches of the engineers; and as regards men, for the parks, from recruits of the next class, for the detachments themselves, from men of the fortress infantry battalions, specially selected by the Commandant. The object of the service is to maintain, whether in peace or war, by day or night, by means of the telephone and the heliograph, communication between the several portions of the area embraced by the fortress, including the fort itself, and with any troops situated outside it. The detachments are classed in three categories according to the extent of their sphere of action.

Balloon Service.—The experimental balloon detachment previously in existence gave such good results as regards the use of balloons in war, that a permanent establishment has been introduced. This consists of 1 balloon school park with personnel and matériel, and 2 fortress balloon detachments which will be formed in peace (1 in 1891) and 3 field balloon detachments for war only.

The superintendence of the military balloon service is under the Inspector of the electrical portion of the Engineers, who has especially under him the balloon school park. This park has for its object: 1st, to train the Officers of the changing and the men of the permanent

establishment practically and theoretically in the ballooning service; 2nd, to make experiments and test inventions; 3rd, to form in war the field balloon detachments and provide them with personnel and matériel.

The park has two establishments, the one permanent, consisting of officers and men drawn from the Engineer corps, the other changeable, composed of Officers detached to the park for instruction.

Caucasian Troops.—The *rapprochement* to the non-Christian born population of the Caucasus received a further extension in 1890. In future the 4 rifle battalions, composed of natives, which already exist, but have hitherto been attached to the Caucasian Rifle Brigade, are to be formed into an independent brigade under its own Commander. In a similar manner a Reserve brigade is to be formed from the 4 reserve infantry regiments (natives), whose commander will have the status of an independent Division Commander, because in war the Reserve brigade is to be developed into a division of 16 battalions.

Further, the Ossetina (Mahommedans) hitherto detached to the 1st Sunsha-Vladikavkas Regiment of the Terek force are to form an independent mounted division. The Officers will be drawn partly from the Cossacks and partly from the regular troops, the non-commissioned officers provisionally only from the Cossacks. Such an Ossetin-Division was formed during the 1877–78 war and was then attached to the Caucasian Cossack Division.

Opoltschenie.—In February, 1890, the following provisional orders were published regarding the organization of cadres for the Opoltschenie. The cadre is to consist of 2 men to each company, battery, or sotnia raised. These non-commisioned officers, or reliable private soldiers, are placed under the district Commander of the local district concerned. In peace the men forming the cadres, to be taken at first from the active troops, have to keep the matériel of the Opoltschenie formation in good order and assist with the training of the men belonging to the 1st category of the Opolthschenie who are called up for the drills. Those drills, of 4 weeks' duration, were performed for the first time in 1890 and have been ordered for 1891. Later on, the cadre personnel will be completed from men who are in the Reserve, but have not been in it for more than a year. The measure seems to be a very important one and answers somewhat to the arrangement of the German Landwehr system.

Fortress Troops.—In almost all the fortresses exercises took place during the summer of 1890 in arming the works and in attacks, in which field troops participated. As a rule the night was chosen for these exercises, so as to experiment with night firing and with the lighting apparatus. A new order by the War Minister directs that the fortress infantry battalions, forming the garrisons of the fortresses in the Vistula territory, are to be specially trained in the construction of earthworks, and also for artillery purposes, and this was done everywhere during the summer. In Kovno a 3rd fortress infantry battalion was raised, and in the small town of Zegrze, recently strongly fortified, 2 new battalions were created. The formation of these

3 battalions, which in war would be converted into 3 regiments of 5 battalions, is a new step in the constant increase and improvement of the Russian fortress troops. Russia can dispose now, thanks to the restless energy of the War Minister, Vannovski, in peace, of a permanent body of fortress garrison troops equalled by no other army in the world.

Training of the Reserve.—In this direction also great activity was displayed in 1890. The training period of 21 days, or 14 days, as the case may be, is employed, according to the following detailed programme of drills:—

In instruction, preparatory musketry drills and individual drill	15 or 9	drills.
Firing	5 „ 5	„
Company drill	6 „ 4	„
Outpost duty	4 „ 2	„
Fighting exercises (with opposing force or marked enemy)	1 „ 1	„
Total	31 or 21	drills.

An important innovation for war efficiency was carried out for the first time in 1890, when the Praportschtschiks (the junior Officers' rank in the Reserve) of all arms were called up for exercises of 6 weeks' duration with the troops of the Active Army. These young men, who are released from their Army service on account of their superior school attainments after from 1 to 2 years' service with the colours, are relegated to the Reserve as Officers, after passing the necessary examination. Afterwards they are liable to two periods of training, of 6 weeks' duration each, while serving in the Reserve.

Drills of the Opoltschenie.—These were carried out for the first time in 1890, though with some modifications in the instructions issued on the subject in 1888. On account of the want of adequate accommodation, only the men from 258 districts in European Russia and the Government of Stavropol (there are in all 502 districts), were called up. Hence, only 90,000 men were exercised of the 200,000 who should have been out. Also in place of the men being called up by successive batches, all were up together from the 7th October to the 7th November, at the district commands. On account of the small number of the instructional staff available, a peculiar course was adopted. The men themselves first chose their own corporals, who were then instructed, after which they imparted the instruction to the men. The results could not be expected to be satisfactory, and it was impossible the men could be trained to shoot —no attempt was made beyond firing 3 rounds of ball cartridge. This is deferred until the second training, which will take place during the men's third year in the Opoltschenie, when they are to fire through a short course with 32 rounds.

Inspection of the Artillery in Firing.—Instructions were published in 1890 for the inspection in firing, under service conditions, of

separate batteries and of groups, 3 batteries, if possible, in unknown ground. The batteries are always to be made up to 8 guns, equipped for service, 4 ammunition wagons, and a reserve limber. Approximately the amount of ammunition issued for each battery is, for distances of about 3 versts, 70 to 100 rounds, of 2 versts, 50 to 70 rounds, and of 1 verst, 30 rounds.

The inspection of single batteries has for its object to test the efficiency of the battery in shooting and in the different service situations in combination with its manœuvring. The inspector is either the Commander of the Corps Artillery or the Artillery Commander of the Military District. In each corps from 2 to 4 batteries are inspected annually.

The inspection of groups has for its object to test the efficiency of the artillery working in masses both tactically and technically combined with its manœuvring. The brigade Commander is always in command of the group. The Corps Artillery Commander inspects one such group annually, and the artillery Commander of the district another, or 2 or 3 groups combined, under the command of one of the corps artillery Commanders.

Infantry Arm.—A small-bore magazine-rifle has been decided on, and the money taken for its manufacture this year.

The delay in commencing this has been due to the difficulty of coming to a conclusion regarding the pattern of the magazine to be adopted.

Turkey.

Peace Strength of the Army.—The average strength of the infantry battalions of the 2nd, 3rd, and 4th Ordus at Constantinople was about 400 men. An increase from 500 to 800 was ordered for the Kossovo division on the Greek frontier, to effect which two-thirds of the recruit contingent of certain cavalry regiments were transferred to it. According to another account, notwithstanding this, the strength was not raised beyond 550 to 600, for the previous strength was 400 at the most.

In Syria (3rd Ordu) the infantry battalions had a strength of only 250 men; in Mesopotamia matters were still worse. In the 7th Ordu, at Crete and in Tripoli, the battalions averaged 350 men.

The strength of the cavalry squadrons is still more uncertain. The squadrons in Constantinople have an average strength of 80 men; but in the 3rd Ordu there are squadrons which, with an establishment of 85 to 90 horses, have only 50 to 60 men, including non-commissioned officers. The cavalry regiments on the Greek frontier, belonging to the 3rd Ordu, are somewhat better situated, having from 70 to 80 men. In the 2nd and 4th Ordus the squadrons average 70 men, but in the 5th and 6th again they are only 60, 50, and even less.

At the end of 1890 the entire peace strength of the Turkish Army amounted, in round numbers, to 170,000 men.

Fortifications.—Since the last war with Russia, plans have been

repeatedly drawn up and studied by numerous Commissions for placing Sinope and Amasra, on the Black Sea, in a better state of defence. In 1890 this important question, for the defence of Constantinople, was again raised, only to be again deferred.

In contradiction of the news published by the Press that the battery of Rumeli Kavak, on the Bosphorus, is completed, and the construction of new works commenced, it can be asserted that only the foundations of the fort are ready, that no steps have been taken for providing the armament, and that no new works were commenced in 1890.

The reconstruction of various portions of the fortifications of Bulair (on the Gallipoli peninsula, to oppose landings in the Gulf of Saros), which had been going on for some years, was completed in 1890. The necessary completion of the armament has not been carried out.

The three newly constructed batteries of the Yeni Kale (at Smyrna) fortifications, which were each armed with two 24 cm. Krupp guns in the preceding year, were named "Hamidie."

During 1890 defensible block-houses were constructed as follows:—

On the Greek frontier at Zagora 5, and at Laros 4.

On the Montenegrin frontier, 5 between Valki, near Durazzo, and Bakdjidjik, near Scutari on sea. The latter received a garrison of 20 infantry.

Infantry Arm.—Of the Mauser rifle, M 1887, 220,000 have been delivered, and arrangements have been made for the remainder of the 500,000 originally contracted for, being of the Belgian pattern, M 1888, with 7·65 mm. bore in place of 9·5 mm. bore.

When, therefore, the delivery has been completed, the following different patterns will combine to form the infantry armament of the Turkish forces:—

280,000	Mausers M 1888	7·65 mm. bore.	
220,000	„ M 1887....	9·5	„
About 500,000	Henry-Martini .... / Peabody-Martini ..	11·3	„

(About three-fourths of the Martini rifles were used during the last war.)

About 150,000	Sniders.....	12·0 mm. bore.	
„ 50,000	Winchesters	10·8	„
„ 50,000	Remingtons.....	„	„

In order to obviate in some degree the inevitable confusion in regard to ammunition supplies associated with the use of arms having different calibres, it has been proposed to have the Martini rifles converted by Mauser to the 7·65 bore.

A still more serious matter is that the powder factories in Turkey are quite incapable of the production of the powerful powder necessary for use with the small-bore rifle. Turkey, therefore, must be entirely dependent on foreign production for the supply of small-arm ammunition required for her Army. There are now in store about

4,000 rounds per rifle for the Henry-Martini, and about 2,200,000 rounds in all for the Mauser M 1887.

Training.—The theoretical and practical training of the Turkish soldier are extremely primitive. Field exercises and manœuvres have no place in it, and as the internal service and guard duties are very moderate, the Turkish soldier, unlike his European comrades, is able to rest in the true sense of the word during his term of service.

Infantry target practice took place only in the 3rd Ordu (Monastir) in 1890, but with only three rounds per rifle. Artillery practice, without system and with little ammunition, took place in some garrisons of the 2nd, 3rd, and 4th Ordus.

Before the war with Russia, the value of the Turkish Army was under-estimated, and it did more than it gave promise of in peace. But now it appears to have been over-estimated, on account of the excellent material of the soldiers, and the reforms introduced since the war. The former is undoubtedly there; but as it receives no training for war, it loses much of its original value, and efficient leaders cannot be formed during peace. As regards the reforms, it is indubitable that since the last war much has been attempted; the misfortune is that too much has been decided and but little carried out.

Infantry Tactics.

The infantry of all the great European Powers have used their utmost endeavours to adapt their tactics to the new conditions created by the introduction of smokeless powder and the small-bore magazine rifle. The opinions regarding the importance of the changes that have thus become necessary in the infantry tactics previously in use, have found expression in the issue of completely new or altered drill regulations and musketry instructions for the infantry.

But the experience of war is still wanting, and it is, therefore, still impossible to form a conclusive judgment on the most important question of infantry tactics. For the experiences at manœuvres and on the rifle-range, in spite of all the trouble, care, and conscientiousness devoted to the subject, are, after all, only peace experiences, from which the deciding factor is wanting, that is, the enemy's fire with its material and moral effect.

In last year's Report the advantages and disadvantages of smokeless powder were so clearly specified that we can be content to refer to it. Still it may, perhaps, be desirable to note the main points in which the tactical efforts of the infantry have to a certain degree crystallized. They are the following:—

1. The movements of troops in close order within the sphere of the enemy's effective infantry fire is only practicable when they are favoured by specially advantageous conditions of ground.

2. An infantry attack can only succeed if a decisively superior fire has been previously directed on the enemy. Success is no longer to be gained alone by the so-called *Schneid.*[1]

[1] Literally "cut" is used here for "dash," "élan," pushing on from the first deployment regardless of hostile fire.—H. H.

All peace or drill-ground representations coming within this category are, therefore, false, and to be condemned most distinctly, be they ever so pleasing to the eye of the spectator.

The second principle for the success of an infantry attack is that a fresh infantry force, as little affected as possible in its moral bearing by its own losses, should carry out the actual assault. The third principle is that an endeavour must always be made to execute simultaneous attacks on the front and flank of the opponent, and therefore, whenever it is practicable, he should be turned.

3. Compared with formerly, the importance of examining the ground and reconnoitring the enemy's position has been much enhanced. This examination will be facilitated by the fact that a future battle-field will no longer, as formerly, be covered with clouds of smoke; but it will be rendered more difficult owing to very little being seen of the enemy if he makes good use of the ground. The demands, therefore, on the Officers entrusted with the reconnaissance of the enemy and the examination of the ground are, compared with formerly, materially increased. That army which has prepared its Officers the best, and most appropriately in regard to these points, will have secured a powerful factor for victory.

4. The skilful use of ground has gained a decisive importance under the present conditions of weapons. That infantry which is superior to that of its opponents in this respect will have a good prospect of success. Skill in the use of ground has not been granted by nature to the German in the same degree as it has, for example, to the Frenchman; this point, therefore, must be of special importance for the German infantry. Away then with the tactics of the drill-ground. Ever new and frequent exercises in changing ground, even if it should be necessary to march pretty far, to show the troops conditions of ground with which they are unacquainted; change and variety in the exercises, representations suitable to war, are all necessary.

5. Judging distance has also acquired great importance. In spite of all the advantages of the small-bore magazine rifle, the area of the fire-swept zone at moderate and long ranges is still proportionately small, especially if it be remembered that in general the object fired at is men lying down. But in future the fire fight will generally be conducted at these distances; if they are wrongly estimated, that is very wrongly, the heaviest fire from the best of modern rifles will be almost innocuous. Great care must, therefore, be taken to train the men in judging distance, and much more so in the cases of Officers and non-commissioned officers.

6. The infantry spade will in future play a greater *rôle*. In the first place every body of troops that awaits the enemy halted, even if this defensive attitude is only intended to be of short duration, will make full use of the artificial strengthening of the ground, in order to reduce as far as possible losses from the enemy's fire, and to hide themselves from the enemy's view. But a strong profile will be required on account of the great power of penetration which is given to the present bullet by the smokeless powder employed. The attacker also will frequently find himself in a position in which he must use

the spade, where and whenever the conditions allow of it. Hitherto the spade has not enjoyed great respect in the German infantry, but this will be otherwise in future. The spade could easily be raised to the rank of an arm. The infantry, therefore, must be diligently exercised in the use of the spade, otherwise bitter disillusions and failures cannot be avoided in war.

7. The demands on Officers and men of the infantry have, compared with formerly, undoubtedly increased. The deployment for the fight has become incomparably more difficult than it used to be. Faults in this in front of an observant enemy will be promptly punished; the unavoidable losses in such a case may easily lead to defeat. In the present conditions of arms a false development of the troops for action can hardly be rectified again. The demands on the subordinate leaders have risen in the same degree. A Captain who knows how to lead his company up to the enemy, while skilfully utilizing every advantage of ground, will reach the decisive distance for obtaining the superiority of fire without too great losses, whereas one single unskilful movement will expose the troops to annihilation.

Lastly, the individual infantry man must be a good shot, a skilful skirmisher, a determined soldier, trusting in his own capacity, who does not always require to be told what to do by his superior, how he is to act in every situation of the fight. In war, the accustomed intervention of the superior and subordinate leaders will only make itself felt in a very moderate degree, for the number of these leaders is small in proportion to the mass of men, and it is just the leaders whom death and wounds remove in the most dreadful degree. A future war will show whether the great trouble and care taken with the peace-training has really been judiciously directed, whether the education of the infantry soldier was so wisely conducted that the circumstances of war find him prepared and do not take him altogether by surprise. The importance of instruction, education, and the strengthening of the moral qualities of the private soldier has increased materially. Good results can be easily obtained in this respect; but only on the condition that the soldier's instructors, that is, the Officers, are themselves thoroughly instructed in all the matters referred to, that they are complete masters of their subject and understand not only to adapt themselves to the powers of comprehension of the common man, but also to arouse within him enthusiasm for the national cause, for King and country.

8. Much trouble has been taken in the military literature to discover means of diminishing losses. The only real way to attain this object appears to us to be in the thorough training of the leaders and of the troops in regard to the use of ground, in the execution of the infantry fight under the most varying conditions imaginable. War demands heavy sacrifices; but in earlier times much was asked regarding the greatness of the result, but very little about the greatness of the sacrifices which had to be suffered to gain that result. Still, these were proportionately higher than was the case in the later wars.

9. Sufficient value cannot be attributed to strengthening the men's

moral elements; everything that contributes to this must be made the most of, gymnastics, fencing, the surmounting of obstacles for the former, good instruction for the latter. It will not be superfluous to impress frequently on the men that the present infantry bullet causes a slighter wound comparatively than was formerly the case at those distances at which, in a future war, the decisive action will take place, that is, at a distance something between 1,100 and 440 yards. The great penetration and hardness of the bullet causes a clean passage without dangerous splintering of the bone; the frightful breaking up effect of the modern infantry bullet shows itself first at the distances between the muzzle of the rifle and 330 yards, at this distance in a dreadful manner. It may well be hoped, however, that the superiority of fire will be established at a distance greater than this, and consequently the enemy will be driven from his position by fire before this bursting effect has begun to show itself. Every soldier must know this; his courage can only increase if he knows that at the most important distance, the danger to him of death is proportionately less than formerly.

10. During a long period of peace an over-estimation of the mechanical and an under-estimation of the moral and ethical elements may easily arise. At an inspection the latter do not impress themselves on the eye of the superior Officer so easily as the former. Lastly, the search for a fixed pattern has spread to all armies. It is so convenient, it saves every one so much effort of mind, so much thinking. The new German Drill Book, 1889 edition, enlarges on this point in an exemplary manner, especially in the introduction to the second part, pages 89 to 94, and Officers cannot be sufficiently recommended to make the general principles contained therein entirely their own.

The fewer the number of those Officers are who have had their own experience of war, the more important is it to earnestly oppose the tendency which inclines too much towards a pattern which endeavours by means of pretty peace pictures to delude itself regarding the dangers that the reality will bring with it. Of greater, but unhappily in Germany not sufficiently appreciated, importance is the study of the newer war histories—not only a study of the broad outlines, but a detailed study, based on the foundation of regimental histories, and similar works of military history. We want for Officers neither scholars nor bookworms, still less can we employ ignorant men. The stiffest drill, the most perfect fixed pattern, all the braveness of peace will not prepare soldiers to overcome the instinct of self-preservation. It is a deception if it is believed that a well covered shooting line can be moved forward in face of the greatest danger by the simple order. But a long peace leads to this; therefore the zealous study of the newer histories of war, of the effect of modern fire-arms for all ranks of Officers, and the greatest possible elevation of the moral education of the troops in peace always having war in view. It stands to reason that the Officers must always keep before their eyes the fighting of all three arms; we require tacticians, not only infantry tacticians.

11. The musketry instruction of the infantry is still continued practically at short ranges, whereas in future the decisive fire action will begin at long and be very often decided at medium ranges. It is to be wished that the preponderance of the training of the individual soldier might be in accordance with this. Matters are similar in regard to the training for fighting in masses. We cling too much to the exercises of detachments; but in the next war, fighting in masses will exclusively lead to the decision; fighting in detachments will occupy an entirely subordinate *rôle*. It is therefore desirable, so far as the circumstances will permit, to give first importance in the training of the infantry to fighting in masses. It would, perhaps, be desirable if the drill regulations prescribed forms for the fighting in masses.

The first results of the new Musketry Instructions based on the introduction of the small-bore rifle were to be observed in the 1890 manœuvres.

At the great manœuvres of the IXth German Army Corps, the firing stations adopted for beating down the enemy's fire were generally chosen at a distance of 550 to 880 yards from the enemy, according to the ground. The assault was thoroughly prepared by artillery and infantry fire. The IXth Corps endeavoured to bring both firing lines and reserves, with the utmost use of the ground, rapidly up to the enemy, the formation and pace adopted being those most suitable to the ground. When supports or reserves had to cross open spaces under the enemy's fire, this was done in loose line formation at the double. In the assault until the hurrah, a continuous fire was kept up by individual men rushing forward and firing.

The ground was generally very skilfully utilized, both by the firing lines and by the reserves.

In France the following instructions were issued for the manœuvres of the 18th Army Corps:—

1. Deployment of the firing line at 2,200 yards, if seen by the enemy.
2. Fire to be opened with volleys at from 1,320 to 1,650 yards.
3. Decisive action of the infantry between 880 and 770 yards.
4. Rapid advance against the enemy's position, during which the men in the firing line are gradually pushed forward by the companies of the battalions in the second line.
5. The general reserve follows at about 1,100 yards for the pursuit.

In the Russian Army a peculiarity is to be found in the hunting parties. They amount to 64 per regiment, including non-commissioned officers, and are formed of specially skilful and courageous men, who are instructed in hunting wild animals, in forced marches, in night exercises, in swimming, rowing, sailing, fishing, gymnastics, and surmounting obstacles. Even fighting with sticks is practised, so that if the men should fall unarmed into the hands of the peasants in an enemy's country they may be able to free themselves again. This institution has, no doubt, much good, but in our opinion trenches at times on play.

The orders issued by the Commanders for the great manœuvres of 1890 in Russia are well worthy of notice. The Grand Duke Vladimir,

commanding the St. Petersburg district, desired that more attention should be paid by the Russian infantry to exercises in extended order, also to connected exercises in varied ground and in fighting formation. He attributed special importance to the correct employment of the sights and to the nature of fire; the officers were enjoined to see that the proper sights were really used.

Adjutant-General Dragomiroff, in his orders to the troops placed under his command for the Kovno manœuvres, dwelt on the following points: "In war," he said, "the chains of firing men would very quickly dissolve, not only under the enemy's fire, but also because the men of the chains having taken shelter behind cover from the enemy's powerful fire, it would be very difficult to get them to rise up and go on again." The General, therefore, ordered that no one was to be allowed to leave the standing position unless the command were given to lie down. But the command "Lie down" was never to be given. In war this proceeding might lead to very unpleasant surprises.

On the night of the 23rd August an extensive fortress manœuvre took place at Warsaw, under General Gourko. The assailants succeeded in establishing the first parallel at between 880 and 1,100 yards from the fort. The electric light assisted the defenders very little; it facilitated rather the work of the attackers. A sortie of the defenders failed.

In December, 1889, new musketry instructions were issued to the Russian Army. After firing at known distances, the soldier is trained in individual firing at unknown distances between 550 and 770 yards, followed by volleys in sections, half-companies, or companies, at ranges from 550 to 2,320 yards. Lastly comes field firing with a tactical idea.

New drill regulations were issued to the Italian infantry in October, 1889, which include much that is in the German regulations. The independence given to the Company Commander is specially noticeable. The normal formations of the battalion are restricted to a broad column, a double column, and a deep column, as in the German book, and there is, in addition, a battalion line formation.

Cavalry Tactics.

Many writers, and especially French writers, have exaggerated the effect of the employment of small-bore rifles and smokeless powder upon the action of cavalry. The reply to all such exaggerations is that the tasks for the cavalry—and this is the case with all arms—will only be more difficult, and entail greater sacrifices, not more restricted or impossible, and that changes of principle in training and tactics do not appear to be at all necessary. Scouting, in the main, is conducted at distances at which even the best fire-arm can cause no loss. Not from the front, shot at by the enemy, but from the flanks and rear unmolested by hostile fire; not as a target, but carefully hidden and concealed; not within the sphere of the enemy's fire, but from points at a distance that afford good observation, and by means of glasses will the mounted man bring his news. He must not

begin to endeavour to gain information after the enemy's position is occupied; he must have seen beforehand what moves into the position; to fix the flanks of the position, that is, the position itself in its entire extent, will not then offer any special difficulties.

For the attack, especially against infantry, careful waiting and a thorough reconnoitring of the opportunity; holding back the closed bodies at long distances and out of the enemy's fire more than hitherto; the habitude of long gallops, so as to arrive at the right time and pass through the fire zone as quickly as possible; the most complete use of ground; the most skilful leading; boundless energy in the collision; all this will allow the cavalry man also to fulfil his task on the battlefield also in the future.

The "Jahrbücher für die Deutsche Armee und Marine" (November) points out the great penetration of the new bullet, and argues that the formation in two ranks must be altogether discontinued and be replaced by rank entire, at least for the attack on infantry. But for the attack on infantry, close lines with sufficient depth are specially important. The fear of the increased penetration could be met by riding with intervals, as is provided for in the new Italian regulations.

It should further be a maxim with all cavalries that successful results are possible in appropriate situations, even against infantry in a set battle.

"All the experiences and improvements in fire-arms have done far less harm to cavalry than the misappreciation of its nature in its training and leading. Smokeless powder and magazine rifles can alter nothing in this."

The "Russian Invalide" adheres to this view. In its Nos. 76, 77 (Colonel Suchotin) it lays down that the entire training of man and horse have but one object—the attack. The rider must get a real passion for this. During manœuvres each body of cavalry must make at least two attacks daily, one of which against infantry. These attacks should never be ruled by the umpires to have failed, not even when there has been no prospect of success.

The "Wajenny Sbornik" (Nos. 6, 7), in a comparison of the Russian, Austrian, and German cavalries, comes to the conclusion that all are unanimous regarding one point, that cavalry attacks against infantry—against unshaken infantry is meant—will have still a good prospect of success if, on account of the losses to be expected, caution be displayed.

Dismounted action is, and remains, a make-shift for some special cases, as, for instance, the defence of cantonments, the temporary occupation of important points until infantry can come up, the defence of defiles with a view to checking a pursuing enemy and covering the retreat, to force a crossing or a passage that it would be too far to turn, under certain circumstances to protect batteries, and, lastly, to disturb an enemy that cannot be attacked.

The "Militär-Wochenblatt" (Nos. 10, 13; also translated in the "Revue de Cavalerie," December) lays stress on the dangers that the dismounted action of cavalry entails. Each leader, therefore, before he decides to resort to it, must ask himself whether the result to be

gained is worth the eventual losses. The loss of one man entails that of a second, who must lead the horse of the man killed. The weakest point is the led horses; a strong mounted reserve should be thought of before everything. Attacks on them, on the other hand, are very paying, and it is of more value to scatter the led horses of an enemy's dismounted cavalry than to cause him material losses by fire. An engagement should never be undertaken in open ground, for here the enemy's cavalry might act destructively. It should never be carried through, but only up to about 650 yards, or remounting, in itself a very dangerous moment, may easily lead to a catastrophe. The breaking off of the engagement should be done by groups, quietly and unremarked, without commands or signals. Sufficient training and exercises in fighting on foot and in firing are indispensable; but all exaggeration is to be avoided.

The necessity for keeping the cavalry together in masses, if results are to be expected in battle, is again referred to. All modern leaders of cavalry, says the "Russian Invalide," as General Wrangel, Prince Frederic Charles, and General v. Schmidt, have all expressed themselves in this sense. It has been admitted to be absolutely necessary to have exercises in large bodies in peace, so as to accustom both men and leaders to fight in masses. And this was done in 1890 by cavalry divisions in all the principal European armies, and in larger combined bodies in several of them, especially in the Russian. These last took the form of opposing forces, the one of 50 squadrons and 24 guns, and the other of 54 squadrons and 36 guns, which operated against one another in Volhynia. It was noticeable that dismounted action, for which Russia has in the past shown a certain partiality, was very little employed, and frequently not used at all in situations adapted to it. The Officers' patrols worked satisfactorily, but the general scouting and the maintenance of communication were not always sufficient, and consequently numerous surprises occurred. The artillery was not always sufficiently protected by special escorts.

As regards tactical formations, simplicity is again recommended as the first requirement for their application in war, in the rapidly passing phases of the cavalry engagement. The employment of simple movements, known to every individual in the great mass, can alone afford a certain guarantee for good execution, on which success exclusively depends; whatever is complicated is only calculated to cause confusion. In practice, as was shown by the great manœuvres, all are agreed in this: always to employ the same simple evolutions and to form line in the same way. The necessity for other formations, such as are still retained in the regulations, ceases entirely with this agreement. The Director of the last exercises at Châlons, for instance, found fault especially with the Commanders of regiments for frequently losing time during the preparatory days with practising every possible kind of movement contained in the regulations, instead of seeing to the most perfect execution possible of simple formations.

In Germany, the Felddienstordnung of 1887 has undergone some not unimportant changes as regards the cavalry, in consequence principally of the new arm and the new powder, as well as of the new

infantry and artillery regulations. The introduction has received an addition regarding the extended sphere of duties of the cavalry Officer, in regard to swimming exercises, the execution of demolitions and blowing up of railway lines, and exercises with the telephone and the telegraph. The two cavalry regiments hitherto belonging to the mobilized army corps are to form, in future, the Corps-cavalry Brigade; divisional cavalry has ceased to be an integral portion of the infantry division, and the attaching of cavalry formations to the infantry divisions is to be left, in future, to the corps Commanders. Thus the two regiments will, in the main, be under a single command, ready for combined action, which should contribute materially towards preventing these regiments being frittered away. Pioneer detachments are, in future, to be attached to cavalry divisions as well as to the horse artillery; they will be carried in vehicles belonging to the train, or in requisitioned ones.

In general, the value of night exercises has not been estimated sufficiently highly. In Russia alone almost have they been practised. But undertakings by night will play an increased *rôle* with cavalry in future; it is therefore of great importance that the troops, both those acting by surprise on the offensive and those surprised, should be made accustomed to the impression of fighting by night, with its confusion and dissolving influences, so as to avoid serious reaction. Patrol duties, particularly, should be thoroughly practised by night, by which the men's facility in finding their way will be much increased.

The question of arming the cavalry with the lance is by no means generally settled. In France, the front rank of the Dragoon regiments are, in future, to be armed with it. But in Russia the feeling is very strong that the example of Germany in this respect is not one to be followed. The whole value of cavalry is centred in its offensive spirit, in the desire of each man to get to the closest quarters with his opponent. This, it is argued, can alone be fostered by cavalry being armed with the sword, the offensive weapon *par excellence*, whereas the lance pre-supposes the enemy being engaged at a certain distance and in a way to foster a spirit of self-preservation. History is against the lance, for the best cavalries, those of Gustavus Adolphus, Charles XII, Frederic, and Napoleon, carried no lances.

A magazine carbine has been introduced in Germany, France, and Austria.

In Russia and Germany special value is attributed to swimming exercises.

Everywhere the training of the necessary personnel for the telegraph service is being continued. Last year's reports dwelt on the difficulties experienced in this direction, and it has now been brought more to light that the employment of this technical auxiliary in the first line restricts the high mobility of present warfare, and that its chief value is rather for stationary conditions. But then the telegraph would be less the element of the cavalry man. Even in the peace experiments serious friction has occurred in its working, which would be materially increased by the uncertainty in an enemy's country. Perhaps, therefore, the extended employment and the consequent great use of tele-

graphs with advanced cavalry, and especially with patrols, should not always be counted on. But there can be no doubt that, under some circumstances, a knowledge of telegraph work may be of use to the cavalry soldier.

Field Artillery Tactics.

As in 1889, the development of field artillery tactics during 1890 was influenced chiefly by the introduction of smokeless powder, now generally adopted by the principal European armies. Although a complete judgment cannot even yet be given regarding the consequences of this new discovery, still a considerable clearing of opinions has taken place. Whereas in 1889 the views regarding the importance to be attributed to smokeless powder differed very widely, now all are unanimous that the introduction of the new compound implies a considerable advance in every direction, and that it is especially the artillery, which has suffered the most from the disturbing influences of the smoke cloud, that will derive the greatest advantages from it and will gain in importance. Whereas in 1889 this subject was still debated and all the discussions on it in print had a more general character, in the course of last year it was clear that those only will gain by the new discovery who understand how to adapt their mode of fighting to its peculiarities. The question, therefore, which occupied much attention was what changes would be required in the employment, organization, and training of the arm in detail, so that it should not only profit by the advantages of the smokeless powder, but especially also so that it should overcome the increasing difficulties caused by its use by the opponent.

The details of the changes made in the German field artillery have already been noted. In a certain degree these are connected with the introduction of the new powder. A portion of the newly-formed batteries must be placed to the account of the two new corps formed in April. But a certain surplus remained which represents a proportionate increase. Until a short time ago, the normal number of batteries to an Army Corps was 20; but a not inconsiderable portion of the Army Corps had to be content with less. At the present time only one corps (the XVIth) is weaker in artillery; whereas, on the other hand, the other corps have 20 or 22 batteries, with exception of those composed of 3 divisions (XIIth Saxon and IInd Bavarian), which are considerably stronger still in artillery.

Another increase in strength has been obtained by arming the horse artillery with the heavy field gun, which really weighs no more than the light, but ballistically inferior, field gun. The realization of the long-cherished thought of an uniform gun, which had been long regarded as altogether impossible, is of still greater importance. The chief advantage gained by this is in the uniformity of the ammunition, owing to which its replenishment, particularly in the case of the horse batteries sent to the front with the cavalry divisions, is facilitated, for any battery can assist them.

Having in view the increased importance of thorough training, especially in firing, the Field Artillery School of Gunnery has been

increased by a 3rd instructional battery and the creation of a Staff for the instructional detachment formed from the three batteries. The number of Officers instructed each year is double what it used to be, and, shortly, every Officer nominated to the command of a battery will have gone through a course at the school.

The new gunnery instructions for the German field artillery, issued in May, 1890, have been received cordially by the entire arm.

The rules for gun practice have not in themselves been radically altered; even the introduction of the double fuze for shrapnel and of smokeless powder have not made such a step necessary. What is new are rules for firing at covered objects with explosive shells, firing at captive balloons, and firing at night.

The question how the infantry attack against entrenched positions is to be prepared by artillery fire has been decided in Germany by the introduction of a breaking-up shell loaded with a powerful explosive and provided with a double fuze. By this step the German field artillery has been placed in a position to participate with the whole of its guns in this task, and, as indicated in the Musketry Instructions, at distances over 3,300 yards. Lieutenant-General v. Sauer advocated, in the "Militär-Wochenblatt," special mortars, as well as explosive shells. In our opinion, against living objects, equally good, if not better, results are obtained with explosive shells from field guns, as with a 12 cm. shrapnel from a mortar or a howitzer. The published reports of the experiments that have taken place at Krupp's and Gruson's with these guns leave no doubt but that this is the case. Indeed, even with the 15 cm. mortar shrapnel the breaking-up shell from the field gun has nothing to fear from a comparison, as seems to have been demonstrated by the experiments carried out at Meppen in 1887. On the other hand, these high-angle firing guns have a very restricted utility for all other purposes of field service. If much greater effects are required against concealed objects, and if shelter has to be destroyed, it will be necessary to introduce high-angle firing guns supplied with high explosive projectiles. It is quite clear that they will then surpass the effects obtained from field guns with breaking-up shells; but this is not alone a consequence of their greater weight, but also of the more favourable course of their trajectory, which allows of the concealed objects receiving really a fire in their rear. But as special guns in the field artillery always entail great evils, in our opinion this should only be resorted to when it has been shown that the effects of the breaking-up shells from field guns are inadequate.

The question is different when it relates to separate heavy batteries, composed of siege guns manned by foot gunners following the field army for special purposes, such as fighting about intrenched positions. In this case all the considerations that can be urged against special guns of the field artillery do not apply. But their employment hardly then belongs to the tactics of field artillery, but they must be subjected rather to the rules that apply to fortress warfare. But General v. Sauer goes still further, for he expresses the opinion that even in the artillery fight the mortar is better than the gun. This is a view

that is quite correct for fortress fighting but not for the field. Were it to be so the field artillery would have to be composed, logically, of high-angle firing guns; for these would be better adapted for all the work that has to be done by the artillery of the attack—the carrying through of the artillery engagement and the preparation of the infantry attack. Guns would only have a justification on the side of the defenders, because they would frequently have to deal with moving troops. We think that the error—*sit venia verbo*—of General v. Sauer lies in the fact that he considers material cover to be necessary for guns in the field, whereas it is quite sufficient if they are covered from the enemy's view by the skilful use of such screens as the ground offers.

The question of the employment of quick-firing guns has been somewhat cleared. The conviction has gained ground more and more that the quick-firing gun is not a special class of gun, but rather the most perfect type of the existing gun. The quick-firing guns of small calibre, which would, it was hoped by some, form the future arm of the field artillery, have been followed lately by others firing projectiles of the weight of those now used. There can be no objection in principle to the introduction of these. But it may be remarked that the rapidity of fire of the field gun has been materially increased of late years. A paper on "Quick-firing Guns" in No. 12 of the "Militär-Wochenblatt" for 1890 is worthy of attention.

Tactics of Fortress Warfare.

The introduction of field mortar batteries in Russia, and the organization in Austria for the formation in war of groups of mobile siege batteries, has led to a practical advance on the part of Germany in the same direction. The Krupp factory, which had already manufactured a 15 cm. mortar for the trials some time ago with field mortar batteries, constructed in 1890 a 12 cm. howitzer. As the weight of this weapon is a little heavier than the heavy field gun and a little lighter than its ammunition wagon, this howitzer is adapted not only for a mobile siege gun, but also for employment in the field in special cases.

From the reports on the Grüson factory it appears that the trials with quick-firing guns and armoured carriages have been resumed with excellent results.

As a consequence of last year's manœuvres at Cüstrin and at Spandau, in which foot artillery took part, money has this year been taken for heavy draught horses for military exercises with this branch. They led also to the recognition of the disadvantages experienced from the foot artillery being entirely separated from the field troops. To remedy this, Officers of the foot artillery have now for the first time been detached to the autumn manœuvres. No doubt, when the tactical constitution of the siege and fortress artillery has assumed a character more suitable to field movements than formerly, the field army in its next war will not be able to dispense with the support of the foot artillery.

THE FRENCH NAVAL MANŒUVRES OF 1891.—A PRÉCIS OF AN ARTICLE IN THE "REVUE DES DEUX MONDES."

Prepared by Commander H. GARBETT, R.N.

THE writer of the above article, who is evidently well acquainted with his subject, commences by commenting on the complete revolution in naval tactics brought about by the modern battle-ship, with its complex armament of heavy and quick-firing guns, torpedoes, and, above all, by the ram.

He points out how the rapidity of action of the present day has especially modified the conditions of naval war; for one thing, the squadrons of the second line, which were formerly armed at leisure after the opening of hostilities, must be ready from henceforth to put to sea with as little delay as possible, to replace or reinforce the ships of the first line, which should be able to meet the enemy on the day war is declared. Hence a system of mobilization of the Naval Reserves analogous to that of the Army, which necessitates the maintaining of but a few men on board the ships which the exigencies of the Budget will not permit being kept fully equipped.

The different types of vessels which constitute the actual fleets are the product of theoretical ideas often pushed to an extreme; at one time huge steel-clad monsters armed with a few heavy guns have been the favourites, then opinion has veered towards ships of great speed with a handier and more numerous armament, affording a much greater rapidity of fire. The result is, he tells us, that the navies of the great Powers are composed of ships very dissimilar, as to the respective merits of which there still exists considerable difference of opinion.

To discover the best method of utilizing these different units of battle, the most logical plan is to place them in face of certain hypotheses resembling the objectives which war might present, and to make them carry out, as far as possible, the operations which these hypotheses allow.

The first great French naval manœuvres took place in 1886, when Admiral Aube was Minister, their object being to establish the *rôle* which torpedo-boats could play in a naval war on the high sea.

Since that time, France and the great maritime Powers have, every summer, mobilized a certain number of ships in the Reserve and attached them temporarily to the permanent squadrons with the view of studying the problems of war at sea. These manœuvres, besides being an excellent training for the Officers and crews, have also been the means of thoroughly testing the matériel and, above all, the machinery of the ships.

It is, perhaps, in this that the principal interest of the manœuvres dwells, and on this point the experience acquired has been considerable. For, as far as the actual conduct of hostilities is concerned, it is certain that for several reasons the manœuvres can only present a very imperfect image of the reality.

In the first place, it is impossible to make the conditions such as they would be in actual warfare, because it would be uncivil to one's neighbours to choose any among them for the imaginary belligerents; the operations, therefore, have to take place in waters other than those which would be the actual theatre of war. Then it is not possible to simulate the "offensive"; to assume the offensive means for a fleet to steam full speed on a given point, which would be unsuitable for tactical manœuvres.

It is not less difficult to devise a plan in which the principal squadron has to remain on the defensive, because the interests of the defence may often best be served by taking the offensive in order to forestall the adversary's blow. All evidence goes to prove, for example, that the best defence of our coasts, as far as our squadron is concerned, is to advance to meet the enemy's fleet, and to endeavour to surprise and destroy him by superior forces. To impose on a certain number of ironclads the duty of cruising before a coast in order to fight an enemy on the supposition that he will attack them is to make a dangerous mistake, of a nature to deceive public opinion.

In reality, such will never be the *rôle* of our naval forces; we have the coast batteries and our mobile defences, which have been created precisely because our battle-ships cannot be everywhere at the same time in sufficiently strong force, and the object of which is to guard against all surprise while our fleet tries to engage the enemy.

How could one expect a squadron, whatever its speed or composition might be, to proceed fast enough from Cape Creuse to Nice, from Toulon to Corsica, or the coast of Provence to Algeria, in order to meet at a given time an enemy at sea and able to appear unexpectedly wherever it might seem best to him?

This was brought well into notice during the manœuvres of 1888, when Admiral Alquier, tied down by his orders, was cruising between Cette and Villefranche, while Admiral O'Neill, who had the advantage in speed, appeared successively before our maritime towns; these latter, believing that their security lay in the counter-movements of the defending squadron, raised a loud outcry because Admiral Alquier did not always arrive in time to protect them. It is impossible to manœuvre two squadrons, the one against the other, without giving to one an objective which it will be the mission of the other to thwart. A scheme of operations ought then to be chosen sufficiently vague to prevent anybody's susceptibilities being wounded, but sufficiently defined at the same time to give scope to tactical combinations.

We have insisted, says the writer, on the preceding considerations, because the public have a marked tendency to draw from naval

manœuvres strategical conclusions, when it is only necessary to look for lessons of a tactical nature; it is a study of the method of employing the different units of battle, and nothing more.

The writer next calls attention to the large scale on which mobilization has been attempted this year: more than a hundred vessels, of which forty were ironclads and cruisers, were concentrated, fully equipped, in the Mediterranean and northern ports.

Those of the ships which were in the Reserve had their crews completed by two classes of the Naval Reserves, and it was the first time that these men had been called upon to serve their full period of twenty-eight days at sea.

He next calls attention briefly to the sources from which the Naval Reserves are drawn, viz., the Inscription Maritime and voluntary enlistment.

The Inscription Maritime places at the disposal of the Navy all the male coasting population, from the age of eighteen to fifty, fishermen, from father to son, for the most part. The inscripts arrive on board our men-of-war already familiarized with the dangers of the profession, and, what is no less important, insensible to seasickness. In return for this obligatory duty, the naval inscripts have the free monopoly of the coast navigation, of the fisheries, and in a general way of the exploitation of the products of the sea. Subject to a stoppage on account of their pay as seamen of the State, or in the merchant service, they acquire, at the end of twenty-five years at sea, the right to a pension, which is paid by the "Caisses des Invalides de la Marine."

In time of peace, the inscripts are subject to a period of seven years' obligatory service, five of which are on active service, after which they pass to the Reserve, and can only be called out by a decree of mobilization.

The Inscription Maritime, which is at the same time the prop of our merchant navy, has been subjected recently to lively attacks. Even in the Parliament there has been formed a certain current of opinion against this institution, now two centuries old; its exclusive mechanism and privileges seem out of accord with the principle of equality for all, in face of the obligation of military service. Objections have been made that the Inscription Maritime applies to nearly 118,000 men, when the Navy only needs about 50,000 men to man all the fleet, and it is concluded, therefore, that it maintains outside military service a large number of men that it does not know how to employ.

One hundred and eighteen thousand men is a round number, from which, however, it is necessary to deduct the inscripts who may be embarked on the ships of the great maritime companies, ships which in time of war would be equipped for service as auxiliary cruisers, or as transports, as well as the seamen who may be absent from France in our sailing ships. On the day of a general levy, the Inscription Maritime would not furnish more than about 30,000 men, a Reserve indispensable for filling the vacancies in our ships, and for assuring the supplies of coal in our harbours, as one would not, indeed, impose this

laborious work upon the already worn out crews of ships returning from sea or from battle.

A Mixed Commission, presided over by one of the Senators, M. Lenoël, has been deputed to study the question, and has arrived at the conclusion to maintain the Inscription Maritime, basing their recommendation on a recognition of the truth of the maxim that "seamen can only be made at sea."

"The Inscription Maritime, then, only furnishes two-thirds of the effective forces of the Navy, from 20,000 to 35,000 men (on the peace footing).

"The continued multiplication of the engines with which our ships-of-war are provided, the complexity of modern guns and torpedoes, &c., have necessitated the creation of specialists, who are trained on board school-ships. These special acquirements require a certain amount of education, which is not always to be found among the sturdy but poor population of our coasts. The rude life of a fisherman, who fights all his life against the elements to win his daily bread, is well fitted to make valiant hearts and good seamen, but leaves little leisure for going to school.

"In order to provide for the recruiting for these special duties, which are called for by the exigencies of our modern fleets, the Navy admits volunteers who enter for a period of from five to nine years, young men from the interior who choose to serve at sea, attracted by the advantages offered for the special duties in view of which they engage themselves.

"It is from this second source that the Navy draws upon for its torpedo-men, gunners, and almost all its mechanical, engineering, and Paymaster's staffs.

"The volunteers who quit the Service at the end of the period of their engagement complete the ten years which they owe for active military service in the Reserve of the Fleet, and are liable to be called out for twenty-eight days on the same conditions as the Army Reservists. At the end of their ten years they cease to form part of the Navy, and are merged in the Territorial Army."

The mobilization and the following manœuvres have already been described in the last number of this Journal, but a few additional details may be added from the account given by the writer of this article before proceeding to the lessons which he draws from them.

He states that the two classes of Reservists who were called out on the 22nd of June numbered about 3,700 men. Those who belonged to the maritime arrondissements of Cherbourg and Brest were embarked at those ports on board ships in the Reserve temporarily commissioned for the occasion; the Reservists of the arrondissements of Lorient, Rochefort, and Toulon were ordered to the latter port to complete the strength of the Mediterranean Squadron, and to commission the ships in Reserve there to be mobilized.

The Mediterranean Fleet has, for some time past, been composed of three divisions of three ironclads each, with a variable number of large cruisers, torpedo-cruisers, and smaller vessels. For reasons of economy, the two first divisions are the only ones kept fully manned;

the third division and the larger cruisers being only partially manned.

The squadron includes, in addition, a division of the Reserve, formed of three ironclads and three cruisers, which also only carry about two-thirds of their proper complements.

In the order of their arrival, the 1,300 Reservists sent to Toulon were embarked on board the ships of the 3rd Division and the cruisers of the squadron, after that on the ships of the Reserve Division.

On the 23rd June, at 11 A.M., the Mediterranean Squadron had received its Reservists, and weighed, in accordance with an order received from Paris. On the following day the Reserve Division also put to sea, so that in forty-eight hours after the Decree calling out the Reserves had been issued, a fleet of twelve ironclads in addition to cruisers and the vessels of the "defence mobile" were ready to meet the enemy.

On the morning of the 25th the fleet returned to Salins-d'Hyères and Vice-Admiral Duperée found himself the next day at the head of a fleet of sixty vessels, the most imposing concentration of naval forces which had taken place in France since the Crimean War.

The writer bears testimony to the zeal and spirit shown by the Reservists, and states that they very rapidly picked up the details of the Service, and mastered the improvements wrought in the implements of warfare since their discharge into the Reserve. Qualified and earnest men, they gave proof that their embarkation will bring to the ships a solid contingent of robust arms and willing hearts.

With regard to the rules in accordance with which the Umpires were to be governed, it has since transpired that, of the six hours during which the attacking force were to remain before any fortified place without interruption before it could be considered captured, three must be in daylight, and the force must also be superior to the land and sea forces opposed to them. To arrive at this end, a numerical coefficient of troops was given for the land defence of certain ports; in order to establish the superiority or otherwise of the defence, this coefficient was added to the coefficients of the ships taking part in the defence, and then compared with the total of the coefficients of the attacking ships.

The defending fleet had to watch a line some 90 miles long between Barcelona and Majorca; this was effected by the battle-ships in line ahead, steering a course between the Formentera and Ilobégat Lighthouses, but not approaching either coast nearer than 30 miles. At 15 miles east of the ironclads, the 1st Light Division (the "Tage" and "Forbin") cruised on a line parallel to that of the squadron, and stretching from the coast of Majorca to 25 miles in the offing, while to the westward the 2nd Light Division (the "Sfax" and "Coulevrine") cruised similarly between the coast of Spain and 25 miles in the offing. The ships are reported to have kept their stations very well, in spite of the night being very dark, and the weather stormy and squally, circumstances very unfavourable for their work; moreover their lights were masked.

It seems probable that the attacking fleet would have successfully run the gauntlet without being observed, as it kept close under the Majorca Coast, but for the fact that the sea was too rough for the torpedo-boats, which about 2 A.M. on the morning of the 9th burnt blue lights, to show they could no longer keep up with the larger ships; this signal was observed by the "Tage" and "Forbin," and the former immediately steamed off to acquaint Admiral Puech. The breeze was fresh from the north-east, and as morning broke both fleets had to detach their torpedo-boats under convoy to seek shelter. On receiving the report from the "Tage," Admiral Puech steered to the north-east, so as to intercept the enemy, sending the "Tage" on ahead again to regain touch with them; both squadrons were at this time steering nearly parallel courses, but out of sight of each other. Unfortunately, during the morning an accident occurred to the cruiser's port engine, obliging her to proceed with a single screw, so it was not until 3.50 P.M. that she again sighted the enemy, being herself observed at the same time by the latter. Admiral des Essarts, finding he was discovered, decided to make for Ajaccio; he would thus be able to take advantage of his superiority in speed to attempt operations against that place, as he had every reason to believe that the defending fleet was well in his rear. Admiral Puech, judging from the enemy's course at sunset that Ajaccio was his objective, decided on steering N. 70° E. until daylight, but as the speed of the "Tage" was now considerably reduced, and both the "Forbin" and "Faucon" in difficulties with their boilers, he was unable to keep touch with him. He, however, arrived off Ajaccio about an hour after the enemy had opened fire, and the latter consequently had to make off to the northward; having the advantage in speed, Admiral des Essarts made good his escape, with only the loss of the "Lapérouse," which ship, having fallen astern during the night, was captured. Not having time to operate against the coast of Provence, Admiral des Essarts contented himself with steering such devious courses during the evening as enabled him to baffle any attempt at surprise by Admiral Puech's torpedo-boats, and at midnight the operations came to an end.

The writer considers the conditions of the defence very unfavourable, and that this must always be the case where a squadron has to cover a large channel and yet avoid dispersing its forces far, for fear of being taking at a disadvantage. In spite of the bad weather and the absence of the moon, Admiral Puech nevertheless discovered the approach of the enemy, and kept touch with him, thanks to the "Tage," which was able to develop a speed of 18 knots for a sufficiently long time, thus affording a signal confirmation of the importance of the *rôle* which cruisers will play in a naval war.

Of the ships mobilized in the northern ports nothing need be said; they did not cruise at sea together, but carried out their drills quite independently. The ships commissioned there, however, formed a grand total of 7 battle-ships, 6 cruisers, and 22 torpedo-boats between the two ports.

If we add to these numbers the Mediterranean ships and those of

the Northern Division which went to the Baltic, we shall find that the Navy had in commission at the same time, and ready for action, 22 battle-ships, 4 armoured gunboats, 18 cruisers, 5 despatch torpedo-vessels, and 54 torpedo-boats.

This is a considerable force, and it may be convenient to estimate the results. Out of the twenty-two battle-ships thus commissioned, only one, the "Marengo," is an old ship; she dates from 1869, all the others have been built during the last fifteen years. We can discuss the value of the different types to which they belong, and which represent, on the one hand, the incessant modification of the conditions demanded by our battle-ships, and, on the other, the scale of the progress realized in the metallurgy and the construction of machinery. But we must remember that all these ships would make a good figure in a naval battle.

Our mobilized battle-ships were, perhaps, less well prepared for working continuously without their machinery breaking down. The ships commissioned from the second category of the Reserve had, for the most part, to be handled with engines with which the men who had been embarked on board them had no practical experience, however much they might have mastered them theoretically.

This is an inconvenience inherent to reserves, to which we shall return.

With regard to the eighteen mobilized cruisers, we must not entertain too high illusions with regard to them. We will here give some details about those commissioned for the manœuvres:—

	Date of Launch.	Displacement.	Speed.	Guns.
			knots.	
1. Duguay-Trouin	1877	3,300	16·0	10·6″ (and under)
2. Forfait	1879	2,300	14·2	15·6″
3. Lapérouse	1877	2,300	14·7	15·6″
4. Nielly	1880	2,300	15·2	15·6″
5. Desaix	1868	1,600	14·2	4·4″
6. Dupetit-Thouars	1874	1,900	15·2	10·6″
7. Fabert	1874	1,900	14·9	8·6″
8. Éclaireur	1877	1,700	15·2	8·6″
9. Sfax	1884	4,502	16·7	16·6″ (and under)
10. Cécile	1888	5,800	19·4	16·6″ „
11. Tage	1888	7,000	19·2	16·6″ „
12. Surcouf	1888	1,850	20·5	4·6″
13. Forbin	1888	1,850	20·6	4·6″
14. Lalande	1888	1,880	20·8	4·6″
15. Condor	1885	1,280	17·5	5·4″
16. Épervier	1886	1,280	17·3	5·4″
17. Faucon	1887	1,280	17·0	5·4″
18. Vautour	1889	1,280	17·0	5·4″
19. Davout	1889	3,000	(?)	6·6″

The first eight are wooden ships, built without compartments, and were nearly all engaged in the operations against Formosa, and whose speed now is more than a knot less than that attained at the trials. They have still some value on account of their armament, but they can no longer be considered as scouts for an ironclad squadron, for which service a higher speed than 16 knots is required. The seven last ones on the list, not including the "Davout," which has yet to undergo some of her trials, have realized good speeds in smooth water, but their small tonnage will not allow of their steaming against even a moderate gale or sea. These vessels, to give them their proper name, are torpedo-cruisers, and were built when that weapon stood in high favour.

Under the idea that the smallest vessel armed with torpedoes could sink the most powerful ironclad, we strove, continues the writer, to give the highest possible speed to vessels of the smallest possible dimensions, losing sight of the fact that high speeds can only really be maintained by large vessels, and, the larger the vessel is, the better is she able to combat the force of the sea and wind, without being brought to a stand-still. No ship of less than 3,000 or 4,000 tons is to-day considered capable of maintaining a speed of more than 16 knots, and these are the dimensions of the new 2nd-class cruisers at present building in England, and which are intended to have a trial speed of 20 knots. Without pretending that our torpedo-cruisers are valueless, they do not come up to the expectations which were formed of them when they were laid down in 1886. Their engines and boilers are very fragile, and consequently wanting in resisting power, as, although expected to develop a very large horse-power, their dimensions have been reduced to a minimum, in order that they may be crammed into the confined space allotted to them. The result is we hear only too often of the breaking of piston-rods and of leaky boilers on board these vessels.

There remain the "Cécile" and the "Tage," which steam admirably, but of these again it may be said that their dimensions are too large and their net cost too high, when it is considered that their only protection is an armoured deck. We do not speak of the "Sfax," as she only has a speed of 16 knots.

Besides the "Davout," there are two other cruisers, the "Alger" and the "Jean-Bart," undergoing their trials, and there we have all the cruisers the French Navy actually possesses for doing the scouting work for her armoured fleets. We must demand the immediate completion of the five protected cruisers, the three 1st-class and the four 2nd-class cruisers now under construction in the dockyards. They should all be afloat in about a year, and we should then possess twenty cruisers worthy of the name; it would be a grand step in the right direction, and one heavy weight the less off the minds of our Squadron Commanders.

Frigates! was the cry of Nelson, and it is also the cry of our Admirals, who all demand that in our fighting fleet we should have as many cruisers at least as there are battle-ships, and never has the need of rapid scouts for our armoured squadrons been more pressing.

As battle-ships cannot pretend to keep up a greater speed than from 15 to 16 knots, and require also to be very careful of their coal, lest they should find themselves out of fuel when the moment for action has come, an ironclad squadron requires very swift, vigilant scouts to scour the sea, to discover and keep touch with the enemy, and, at the same time, to maintain constant communication with the Admiral. Without scouts, a squadron moves in the dark, and may fall unawares across a superior force, or else let a weaker enemy shoot past at a short distance by taking advantage of the night.

Rules for this important vedette service are now being codified, and the new tactics practised by the Mediterranean Squadron, but there are not sufficient cruisers to carry them out properly. We do not doubt but that Parliament will patriotically sanction a suitable addition to the fleet of vessels of this class.

The writer next proceeds to go into the question of the ships in reserve, a question which he considers must be settled by Parliament.

There are three classes of the Reserve; in the first, the ships lie in the roads with most of the Officers and about two-thirds of the crews on board, ready for sea with the exception of the provisions which would deteriorate by being kept long in the store-rooms; every three months these ships weigh for a cruise in the offing and to fire their guns; they ought to be ready to put to sea in forty-eight hours, for no matter what destination. Theoretically, the first class is very nearly completely equipped and manned; there is only one drawback, it costs too much; so that up to last year, with the exception of ships making their trials, there was not one single vessel in this class.

The second class is formed of the coast-defence ships, the older ironclads, and the unattached cruisers. They have a Commander, a small number of Officers, half the engine-room staff, and a fourth of the normal crew; these, however, are not considered as embarked, but as on shore service.

The third class comprises the very old wooden cruisers and transports; these ships are nearly completely dismantled, and are looked after by a provisional Commander and a small number of men.

The second class is, for the time, by far the most numerous; it ought only to be composed of wooden ships or those of inferior speed, or those fitting out for distant stations. It will be so in the future, as from henceforth all modern ships not in commission are to be placed in the first class.

In view of the complicated construction and machinery of the battle-ships and cruisers, the writer emphasizes the necessity of maintaining on board these ships a sufficiently numerous and permanent staff, who will be thoroughly acquainted with all the details of the bulkheading, pipes, valves, &c. He considers it indispensable that the engines should be frequently worked, so that the engineers who will be in charge should be completely familiarized with them.

It is to comply with these "desiderata" that the Reserve Division of the Mediterranean Squadron has been created this year. The vessels composing it are placed on the footing of the First Reserve. Under the command of a Rear-Admiral and annexed to the Mediterranean Squadron the division weighs frequently with the fleet and takes part in the manœuvres. The results have been so satisfactory that the Minister of Marine has provided in the Budget of 1892 for constituting a second Reserve Division. We shall then have the best part of our battle-ships in the Mediterranean ready to drop into line in forty-eight hours, and there is no doubt that ultimately the same measure will be applied to the Northern Fleet.

Without expatiating on the technical lessons which can be drawn from the manœuvres in the Mediterranean, there is one fact, continues the writer, which has made a deep impression on everybody; that is, that for the most part the torpedo-boats were unable to follow the battle-ships at a speed of 12 knots even in moderate weather.

He traces the torpedo-boat movement in France, giving to Admiral Aube the merit of the impulse for the construction of these vessels. He is of opinion that their small stowage of coal and water, the excessive fatigue imposed on Officers and men, where sleep and repose are impossible, the impossibility often of cooking, make it necessary to replenish them and to be changing their crews every three or four days; and that the manœuvres have proved once more that torpedo-boats are not fit to be attached to a squadron on a permanent footing: if it should go to sea for more than three or four days, they cease to be an accession of strength and become a worry and an "impedimentum." He considers that on the coast their *rôle* has lost none of its importance; they are valuable watch-dogs, which, while they remain within reach of shelter, where they can find repose and renew their stores, will know how to drive off hostile cruisers; but the breakdowns which have occurred among them show that there are weak points in their organization. For torpedo-boats, even more than for the large ships, it is necessary that the personnel called upon to serve in them in time of war should be continually embarked in time of peace for real exercise, in the minimum proportion of at least one complete crew for two boats.

He quotes the results of the English torpedo-boat manœuvres of this year as confirming the opinions formed by French Officers from their own experience of the seaworthiness of these craft; pointing out that every time the English torpedo-boats, which were supposed to have a speed of from 19 to 20 knots, were chased by the torpedo-catchers with a nominal speed of 2 knots less, they were invariably captured, which would seem to indicate that the boats rarely went more than 16 knots at sea. The torpedo itself, so terrible if it strikes its object, is a projectile far more uncertain than that from a gun; in the English manœuvres, although the torpedoes were all of the latest pattern, only one in eight seems to have struck the mark.

The writer next expresses doubts as to the speed which ships in the Reserve, commissioned off-hand with a staff new to the machinery,

would be able to maintain. The cruisers "Lapérouse," "Desaix," and "Dupetit-Thouars," commissioned under these conditions, were unable to maintain their estimated speed on account of the difficulty of keeping steam. The ironclads did better, but he points out that the English Northern Squadron this year, although composed of new ships, when steaming full speed for a night were unable to maintain a higher speed than from 13 to 14 knots, and the stokers had to be reinforced by men from the deck. This, in his opinion, was due to two causes, first, that the ships were very dissimilar in size, tonnage, and construction, the cruisers ranging from 1,890 to 6,000 tons, while the torpedo-catchers were only 735 tons. Ships so different have not the same qualities at sea, and cannot develop the same speed, although the conditions are identical. The second cause was the impossibility of relieving the stokers sufficiently often from want of men. In England, as with us, when ships have to steam full speed, it is necessary to employ half the stokers to feed the fires instead of one-third, and yet there are not arms enough.

We must therefore insist that due provision is made for the needs of the furnaces, and that our squadrons be made occasionally to steam full speed for at least twenty-four hours, so that we may know what speed they may be depended upon to keep up.

The lessons then to be drawn from this year's manœuvres are: the increasing importance of the *rôle* of the scouters, and the urgency for us to immediately construct the fleet of cruisers which we need; a definite condemnation of small cruisers; the almost exclusive limitation of the action of torpedo-boats to coast defence; the uncertainty of the efficacy of auto-mobile torpedoes, and the necessity of making decisive experiments at sea with these expensive weapons; the maintenance in as complete a state of equipment as possible of the ships of the second line, and the formation of homogeneous reserve squadrons; also the increasing, if necessary, of our effectives in view of the requirements of the stoke-holes.

The writer concludes his article by describing the visit to and inspection of the fleet by the Ministers of Marine and Foreign Affairs, as well as by a certain number of Senators and Deputies belonging to the newly created Parliamentary Commission on the Navy. "For three or four years past, our Navy," he says, "has been sharply criticized by certain journals, who have tried to sow distrust with regard to our naval 'matériel,' and to cast discredit on the administration of the Navy, and that with an unheard-of violence of language. This press campaign has all the more surprised public opinion, as until lately the Navy had enjoyed, on the contrary, a considerable amount of popularity in France; people have recalled the glorious pages which have been added to our history since its reconstitution, marvellously effected at the close of the wars of the First Empire; its solid organization, which permitted it to contribute materially to the national defence in 1870; finally, the expedition to China has shown that our sailors have thoroughly mastered their duty.

"Fourteen years after our defeats, Courbet and his squadron have

been the first to restore the prestige of victory to the flag of the Republic.

"If one believed the statements of some journals, statements which found an echo in Parliament and the Commission on the Budget, our Navy had lost all title to the confidence of the country, and found itself without the means of showing a front to the duties which lie upon it."

In face of the persistence with which these attacks were renewed, the Senate and the Chamber of Deputies nominated lately a double Parliamentary Commission for the Navy, such as already existed for the Army.

It was to the members of this Commission that the invitation was given by the Navy that they should go and examine the different units of the large fleet assembled for the annual manœuvres, and be initiated into their different uses in the squadron.

The Senators and Deputies who responded to the invitation were eagerly welcomed; everybody understood that it was an excellent thing that Members of Parliament, called daily to discuss the bases of our naval establishment, should place themselves *en rapport* with the squadron, where all the questions in connection with the personnel and matériel are constantly studied and tested.

On the 12th of July the whole force weighed and exercised off the Hyères Islands, fleet evolutions which were extremely interesting to the guests of the squadron.

At 7 A.M. on the 13th July the squadron weighed to return to Toulon, the fleet making a sham attack on the harbour.

After some skilful evolutions in the Bay of Hyères, the squadron formed in line ahead, the "Formidable" leading; there were thirty ships in the column, and each was flanked by two torpedo-boats.

We shall not speak here of the firing, both on board the ships and from the shore batteries, as the squadron steamed towards the harbour's mouth. That which more particularly struck the seafaring public, who were present in crowds at this imposing *coup-d'œil*, was the entry of the ships into the harbour.

In less than three quarters of an hour the thirty ships, who followed each other at a distance of some 400 yards from mainmast to mainmast, had entered the harbour in spite of the smoke from the guns, and taken up their moorings, not ceasing their fire until the head of the line of buoys was reached. This brilliant evolution shows the safety felt in the *coup-d'œil* by the Commanders of the squadron, and the confidence which the Commander-in-Chief had in his Captains.

We have not been afraid in the course of this article to profit by the occasions which have offered themselves to make certain digressions, in order to bring to the light the circumstances in which our Navy may find itself placed in face of eventualities which may affect it.

Without having to consider it as menacing, it is certain that the war for which we are preparing ourselves without ceasing in order

better to stave it off will see one of its first stages developing itself in the Mediterranean.

It is probable our fleet will have the honour of firing the first shot, and one can foretell that the reverberation will be considerable. If the result of our first engagement at sea should be favourable to us, the solidity of certain alliances existing or eventual will be singularly shaken.

A naval victory will in any case lighten the rude assault which our frontiers will have to sustain, by obliging our enemies to cover a large sea front which is open to our blows.

Mark the object for which the fleet is continually working, where the highest confidence reigns from the top to the bottom of the hierarchical ladder; this confidence arises from the excellent training; each one knows himself to be capable of the effort expected of him by his chief, and, in addition, our Officers have tested under all conditions the qualities of the ships that they will have to take under fire.

It seems to us well to say this, because this aim does not suppose any preconceived idea of aggression, and also because we have known for too long what unavowable and unavowed ambitions are working to systematically calumniate our Navy, which, silent and resigned, nevertheless prepares itself to play the grand *rôle* which is reserved for it in the national defence.

NOTICES OF BOOKS.

Geschichte des deutsch-französischen Krieges von 1870–71. Von GRAF HELMUTH VON MOLTKE, General-Feldmarschall. Berlin, 1891: Mittler u. Sohn. Pp. 428. Size 8¾″ × 6¼″ × 1¼″. Weight under 2 lbs. 2 ozs. Price 8s. 6*d*.

The Franco-German War of 1870–71. By Field Marshal Count HELMUTH VON MOLTKE. Translated by CLARA BELL and HENRY W. FISCHER. In 2 vols. London: 1891. Osgood, McIlwaine, and Co. Pp. 578. Size 9″ × 6¼″ × 3½″. Weight under 4¾ lbs. Price 24s.

It is improbable that there is any work on military history of which the publication had been looked forward to with greater eagerness than that now under notice. In the official account of the Franco-German War, there is ample room for writing "between the lines," and who so competent to do so, who knew so well what to write between the lines, as the Chief of the German General Staff? Count Helmuth von Moltke, Major and Adjutant to His Imperial Majesty, tells us in the preface that it was owing to his pertinacity that the old warrior undertook to write about the war. It would be interesting to know what were the feelings of the nephew when he read what the uncle had written. Not a word between the lines, but simply and solely an abridgment, in some parts dry and meagre, as all abridgments must be, of the narrative contained in the five thick volumes of the official account.

The Official Account of the War is truly a masterpiece, and few but the great von Moltke could have produced it; the abridgment might have been written by very many, so long as they knew that account thoroughly, and could write their own language. The reason is not far to seek. From the preface we learn that the young relative had several times entreated the old warrior to note down some of his rich store of reminiscences. The Field Marshal always objected in the same words, "Everything which I have written regarding it, and is worth keeping, lies in the Archives of the General Staff. My personal experiences had better be buried with me." On another occasion he remarked, "What is published in a history of a war is always coloured by the result; but it is a duty of reverence and of love for one's country not to destroy certain prestiges which the victories of our army connect with particular personalities." If the nephew believed his uncle would continue to act on these principles, he could hardly have expected that, if ever the work was taken in hand, the public would be told much more than they knew already. However, eventually, the Field Marshal said, "You have the account of the campaign published by the General Staff; that contains everything;" and he added, "it is too detailed and technical for the majority of readers; it must be written some day in the form of an epitome (*auszugweise*)." Then he set to work, but holding to his principles of keeping back everything not already recorded, and of not injuring professional reputations, he produced as a result an epitome, and nothing more, of the official history. How Major von Moltke can describe the work as "throughout the expression of the private opinion of the Field Marshal on the war" is simply incomprehensible. Only twice does any such opinion, not already recorded in the official account, reveal itself: once, when he condemns strongly the wild advance ordered by Prince Frederick Charles, at nightfall, on the field of Vionville; and once again, where he finds fault with himself for allowing the IInd Corps to cross the ravine at Gravelotte, on the evening of the 18th August. Those, therefore, who really know the official account will not learn anything more about the war from the perusal of the epitome; whilst those who study the war from the epitome only will not, we think, learn more than the main facts.

That anything from the pen of von Moltke, even as a literary composition, must be of a high order, goes without saying; yet, having a tolerably full knowledge of the official account, we cannot refrain from remarking that some of the notices of the abridgment which have appeared in the press seem to be somewhat overstrained in commendation. We must own we do not value the abridgment very highly as a contribution to military history. There is no royal road to the acquisition of a knowledge of military history generally, or of any one campaign in particular, and not even a von Moltke can make one.

Probably but few who read these lines will consider the opinion expressed in them of any weight, when it is given on a work coming from the pen of one of the greatest soldiers of the century, for they will not unnaturally say that what von Moltke has written must be well worth reading. The book will, undoubtedly, be widely read, and therefore we can only counsel those who intend to do so, to read the German original in preference to the English translation, which stands at the head of this notice; for the variations which the translators have played on the original are so numerous, that in many instances incidents of the campaign are presented in a light which must be absolutely new and decidedly surprising, even to the German General Staff itself. From the host of these variations we select a few:—

Vol. i, p. 9, instead of the "Xth and Guard Corps," we come across the "Xth Corps of the Guard," a non-existent body. At p. 10 we find the IVth Corps substituted for the VIth Corps, an important paragraph is omitted, and the date of the order for mobilization is given as the night of the 16th, whereas the original gives it as as "die Nacht zum 16. Juli," which means that of the 15th. A precisely similar mistake occurs at p. 16, vol. ii, in connection with the battle of Villiers-sur-Marne. Returning to the first volume, on p. 11, "corps" are put for "armies," whilst on p. 13 is to be found the following startling statement: "The Colonel in command of the IIIrd Army Corps desired to wait for the arrival of the IVth and its baggage train," when the original tells us that "the Supreme Commander of the IIIrd Army desired to wait for the arrival of the VIth Corps and the trains." Passing by such little oversights as the three French "Divisions" at Saarbrucken, instead of "Army Corps," p. 14; "batteries" for "trains," p. 15; the Château Guisberg being "a very formidable fortress," p. 17; and the farmstead of Flavigny a "town," p. 50, we come to the following extraordinary statement in connection with the battle of Vionville: "The 5th and 6th Cavalry Divisions and part of the 37th Brigade were engaged in an independent fight near Tronville." Von Moltke knew a great deal more about these troops than the translators, and he merely tells us that they formed a second line in the battle ("bildeten ein zweites Treffen"). At p. 57, the 4th French Corps is called a Brigade. At p. 59, still dealing with this battle, it is stated that the Germans had only "sixteen squadrons left, which now joined Barby's Brigade," whereas the whole together made up that number; and two or three lines further on, that a little in advance of them stood the 13th Dragoons, "to receive the charge of the squadron of the Guards," the real meaning being they were there to receive their own Guard squadron on its retirement. At p. 151 we read of the attack on the "artillery defences and village intrenchments of the French line, from Servigny to Poix." At p. 210, "the guns of the Guards forced a way into the glass works" at le Bourget, whereas it was not "geschützen" but "schutzen," riflemen, who did this.

In vol. ii, p. 6, there is this almost comical mistranslation: "In consequence of the enemy's enormous numbers on Mont Avron, the Saxon Corps believed themselves immediately threatened on the right bank of the Marne, and *requested to be immediately transferred to the left;*" whilst on the next page we are told, that to cover the retreat of a sortie, General Vinoy opened a rapid fire on ("aus") Ivry and the adjoining works. At p. 15, the fact that "six Wurtemberger and nine Prussian batteries were by degrees brought into action against Champigny," is put before English readers in the following strange guise: "The 6th Wurtemberger and the 9th Prussian Batteries were by degrees brought into action against Champigny;" and finally, at p. 97 is one of several similar misrenderings: "The columns starting at least six miles apart," instead of "on a front of at least six miles."

It is impossible that the publishers will allow the multitude of errors which are

to be found in the first edition of this classical work to remain in those hereafter issued, and it will therefore be as well, perhaps, for the military members of the Institution to await the publication of the second edition before purchasing the book. The addition of a few more maps would be a decided improvement.—L.A.H.

Life in the Royal Navy, by a Ranker. Published by G. Chamberlain. Portsmouth. Size 7″ × 5″. Pp. 170. 8 illustrations. Weight under 9 ozs. Price 1*s.*

A record of naval life in Her Majesty's Navy, from the writer's entrance as a lad into a training ship till, having passed through the subordinate ranks, he blossoms into a warrant officer at a comparatively early age. The narrative appears to be truthful, and is free from the adventitious aid of a practised writer, but the illustrations are very poor, both in design and in execution.

Rulers of India: Clyde and Straithnairn. By Sir O. T. Burne. Clarendon Press, 1891. Pp. 183. 2 portraits, 1 map, and an index. Boards. Size 7½″ × 5″. Weight 13 ozs. Price 2*s.*

The author says justly, that "to compress into chapters a series of events which require volumes is a hazardous undertaking." His work proves the justice of his remarks.

Major-General Sir Owen Tudor Burne, K.C.S.I., was on Lord Straithnairn's Staff; he was not on Lord Clyde's. The many omissions in his sketch of Sir Colin Campbell, and the comparatively excessive praise of Sir Hugh Rose, may therefore be due, perhaps, to the position he occupied. An even-handed division of the due meed of honour to be partitioned between soldier and civilian during the Indian Mutiny is most desirable in the interests of historical knowledge for coming generations of Englishmen. This is hardly to be found in the present book. At the same time, no record of the stirring episodes of 1857 and 1858 can fail of being of high interest to natives of this country.—X.

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WOOLWICH.—Since January, 1887, FORTY-FOUR PASSED.

Places taken include:—4th, 6th, 7th, 12th, 14th, 16th, 22nd, 23rd, 27th, 29th, 30th, 31st, 34th, 35th, 36th, 45th, &c.

June, 1891, THREE passed, viz., 33rd, 42nd, and 44th.

SANDHURST.—Since January, 1887, ONE HUNDRED AND SEVENTY gentlemen obtained Cadetships.

Places taken include:—1st, 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, &c.

June, 1891. SEVENTEEN passed, viz., 5th (Cavalry), 17th, 21st, 23rd, 35th, 45th, 47th, 49th, 58th, 93rd, 100th, 102nd, 123rd, 124th (Infantry); 4th, 6th, 9th (University).

Some of the places in the various subjects for Woolwich and Sandhurst include FIRSTS in Latin, Greek, Mathematics, Geology, Chemistry, French, German, Italian, Spanish, Geometrical and Free-hand Drawing, and Composition, i.e., in EVERY SUBJECT.

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N.B.—These successes for Woolwich and Sandhurst will be found to be far in excess of any other Tutor or Public School. The Sandhurst numbers do not include those who merely obtained sufficient marks to be qualified as Militia Officers.

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Since January, 1887, two hundred and eighteen have passed including nine FIRST and seven SECOND on the various lists. In March, 1891, TWENTY-SEVEN succeeded, among them being the *first* and *second* on the whole list, and *first* on the Artillery list.

The FIRST and SECOND places in Law number twelve; in Topography, sixteen; in Tactics, ten; in Fortification, nine.

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